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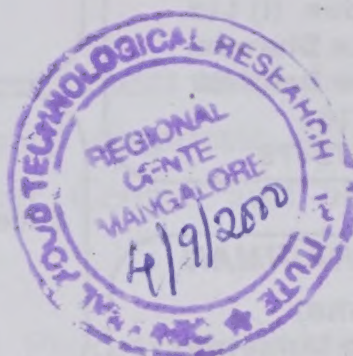
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Editorial

Food Processing Industry is not in very healthy state in India. The policies worked out were to make this sector as 'thrust sector' of the economy. Foreign Direct Investment (FDI) and indian domestic investments have also been a matter of concern with FDI at 95 crores and domestic investment at 2050 crores.

Interestingly, the factors responsible for this low investment can't be clearly identified. The basic reason seems to be disinterested corporate sector, low profile support by Banking Sector and high rates of Central and State taxes. There may be many more micro level reasons.

Parliamentary Committee of Department of Food Processing Industries has severely commented on the undermining of the Ministry of FPI status to a Department. This has given a wrong message to the world that India retraces economic priorities. The Committee has recommended that this sector must be under the charge of a full fledged Ministry.

The State Governments are required to assist this sector in all possible ways. Infact in the name of rationalisation of Sales Tax, the upward levy of S.T. has been announced by most of the State Governments on processed foods.

Department of Food Processing Industry in the Union Government is seriously working on the 'Task Force' report on Food Processing Industry. Once this policy document is finalised and adopted by the Government, serious issues like codex, W.T.O., local food laws, funding from Banks will be attended on priority basis. Presently, the investments from the institutions are practically negligible.

We have to regulate our imports of processed food. No imported products should violate food laws and should be price competitive. Indian products must be lower in price compared to imported products, when we plan to utilise our crop wastages of 35% to 40% during the crop season.

Private sector on their own can not bring positive results without the full support of Union and the State Governments.

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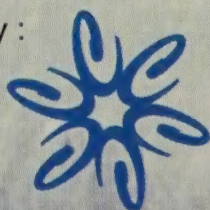
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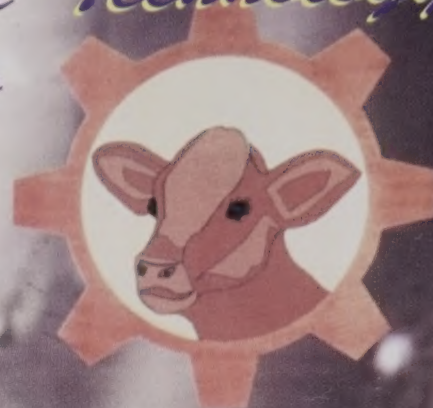


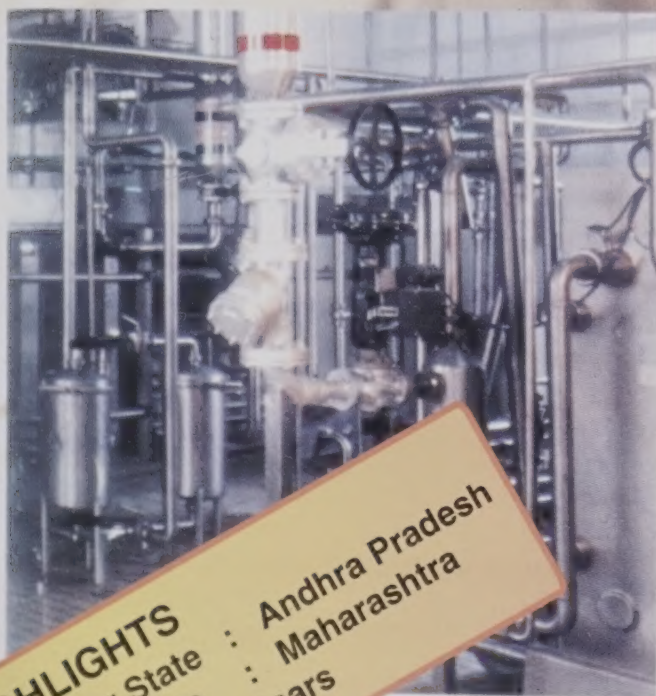
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- * Processed & Extracted Foods
- * Food Packaging Machines & Equipment
- * Measuring, Testing & Material Handling Equipment and Systems
- * Liquid Food Processing
- * Research & Development



HIGHLIGHTS

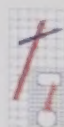
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ASSOCIATION NEWS

Presentation before the Committee of Ministry of health and Family Welfare (Department of health) on issues Connected with the Amendment to PFA Act 1954 on 1st March 2000.

INTRODUCTION

- Vital role of food industry in Economy.
- Comprehensive food monitoring system necessary to secure consumer welfare safe, hygienic, wholesome food.
- Food industry highly regulated - objective of food law to be fully realised.
- Growth hampered due to rigid frame work and administrative controls - harassment in implementation.
- Streamlining of food laws and its implementation - no compromise of consumer interest.

LEGISLATIVE ENVIRONMENT

Issue :-

- (I) Under the PFA Act, 1954, if a manufacturer uses a new ingredient/additive for the manufacture of non-standardised food article in order to reduce costs and /or deliver incremental product benefits to the consumers, like special or improved flavour, colour, stability, etc., such category innovation is not permitted by the existing law.

This kind of an innovation would require the approval of the Central Committee of Food Standards (CCFS) which operates under the aegis of the Ministry of Health & Family Welfare. The process of approval is highly time consuming (average period for approval is about 18 months or longer in India as compared to 90 days in the US) and is also subjective as it does not have an established objective system of evaluation either based on the recommendations of other International Scientific bodies like JECFA, US-FDA, CODEX, EEC Regulations etc. or based on the scientific opinion of the food research labs and institutions within the country. Also the CCFS is a large body comprising mainly of government representatives and a low representation of the industry & trade, thus leading to a less efficient and heavily burdened system. In the past 44 years of existence, the CCFS has met only 42 times.

- (II) The composition and working of CCFS needs to be reviewed and rationalised in order make it manageable and proactive.

The CCFS needs to meet at least 3. times in a year. The approval process of new ingredients and additives etc. needs to be time bound (6 months) and the objective criteria for approval of additives and new compositions within the time limit of approval should be specified by the CCFS. Whatever is adopted by international organisations like CODEX etc. should be considered as a special basis and approved with immediate effect. In the long term, the CCFS would need to be replaced by the governing body of FRA.

- Multifarious laws and enforcement agencies - central & state (PFA, W&M, Orders under ECA - FPO, MMPO, Vegetable products oil order, BIS, AGMARK)
- Principal food law - prevention of food adulteration act - contemplates adulteration to be rampant - focus on detection of adulteration and prosecution (Hoarding/Adult. Earlier - Situation has progressed)
- Need for unified code of food safety laws - emphasis on good

manufacturing practices - better protects public health and promotes industry development on scientific lines (Venkatramaih)

- Work on past efforts.

(Task force under chairmanship of Ex-C.J. of India, Mr. E. S. Venkataramaiah, Jan. 96 report)

FOOD STANDARDS/ADULTERATION - SUGGESTIONS

- Divide standards - mandatory standards for detecting adulteration - separate quality characteristics (Appendix - B recipe oriented Zero tolerance - Suggests final quality - moisture in milk products, confectionery, weather deviation)
- Distinction between adulterated and genuine non-conforming food.
- Adulteration confined to prejudicing health.
- Use of Food Additives - include on basis of scientific evidence of any recognised body adapted to local environment - eliminate discrepancy in use between classes of food products. (Class II preservatives 0 (R 55); synthetic colour (R 29); colour in canned tomato juice; ice-cream but not in soups)
- "Adulterant" only if reasonable belief of use for adulteration. (Any material used/usable for adult - burden of proof on vendor intention for sale)

ISSUE:-

2. IN ADEQUATE INFRASTRUCTURE AND LABORATORIES HAMPERS DECISION MAKING.

- CENTRAL COMMITTEE FOR FOOD STANDARDS
 - Reconstitute to have maximum possible scientific input and adequate industry representation 51 members - 45 from Govt. including DDS of CFL-1 Food, 1 Hotel, 1BIS; Sub Committees.
 - Rationalise strength to manageable size.
- LABORATORIES AND EQUIPMENT
 - Standardisation, Accreditation and Audit by expert (Calibration)
 - Recognition of Private Laboratories.
- Analysis, Food Inspectors
 - Appointment of qualified personnel of appropriate sanctioning authority seniority (sanitary inspectors/Police personnel appointed multiplication for same offence (MSG) Food inspector sanctioning authority)
 - Updation of knowledge and skills

ISSUE:-

3. There is a need to persuade state governments to give adequate focus to the growing

needs of public health by increasing recruitment of inspectors, increasing office space and also to have a closer co-ordination with the Ministry of Health.

STRINGENT PUNISHMENT FOR VIOLATIONS - SUGGESTIONS

ISSUE:-

1. The penalty provisions under PFA should be graded according to the gravity of the offence. The PFA Act should also provide for compounding of minor-economic offences or issuing a warning wherever Food (Health) Authority feels that such action serves the purpose.
- Minimize Exclusive reliance on penal provisions provision of mens REA (Intent to adulterate) (Treatment akin to criminals - bail for missing batch No.)
- Graded punishment / penalty based on gravity of offence - (Minimum Punishment not fixed - left to court - on circumstances)
- Restrict criminal sanctions only for Adulteration compounding of certain offences. (Due consideration before sanction)
- Substandard/Misbranded products should only attract fine/Penalty

SCHEME OF PFA - CRIMINAL LEGISLATION

- For prevention of food Adulteration.

- Prescribes food standards/ quality, declarations
- Monitors compliance by controls/checks
- Stringent punishment for any violation
- Infrastructure for implementation
- Centre responsible for law and state for implementation.

FOOD LAW MONITORING-SUGGESTIONS

- Sampling Lifting
 - Only basis specific information/suspicion of Adulteration-special consideration for Agmark products bearing certificate of ISI/Accredited agency.(Criminal Legislation can not go on sampling; Percentage of samples cleared-limitation on PFA unlimited field of checking (Form VI) "To be analysed for standard specification" - percentage fat in condensed milk)
- Sample Division
 - Fourth Sample to manufacturer for independent analysis.
- Analysis by public
 - Uniformity and transparency of analyst method.
 - (Improper preservation, choice of method standardisation of Reagents)
 - Permitted deviations basis method adopted
 - Checking only for

adulteration food law monitoring-suggestions (Contd.)

- Sanction of prosecution by local health authority
 - Opportunity to manufacture before prosecution (MSG naturally present, 0% fat in condensed milk, para report copy EG-USA).
 - Check' up with concerned agency for certified products.
- Analysis by C.F.L.
 - CFL Report should be in addition to P.A Report (UK.Sufficient evidence)
 - Adjudicating Authority to Deal with report.

AIFPA, had appointed a committee to deliberate on harmonising Food Laws in country. The recommendations of the Committee were sent to Ministry of Health and Family Welfare vide letter No. 371-B/98 dated 07.07.98. The Committee comprised of the members from CII, Assocham, FICCI/CIFTI, PHD Chamber of Commerce besides experts from the Industry.



Safe Food and Safe Food Assurance systems

Brain Storming Discussion

21st March 2000,
Trivandrum at Hotel
Amrutha, Trivandrum.

The Meeting was organized by the

All India Food Processors Association in collaboration with the Kerala State Small Industries Association, The Gandhi Peace Foundation, Kottayam, and The Consumer Guidance & Research Society of India, and supported by The Department of Food Processing Industries, Government of India.

The meeting was inaugurated by Sri V.C. Kabeer, the Hon'ble Minister for Health, Government of Kerala. It was attended by Sri V. Vijayachandran I.A.S., Principal Secretary (Health); Sri Janaradhana Iyer, Retd. Chief Analyst, Government of Kerala; Sri Sivakumar, Technical Assistant, Directorate of Health Services; Sri Anil Kumar, Technical Assistant (Law), Directorate of Health Services; Sri R.C. Mathew, Director, Bureau of Indian Standards; Sri V.G.Sarvade, Inspecting Officer, Directorate, Fruits & Vegetable Preservation, Dr. Anandavalliamma, FAO Consultant on Food safety assurance systems; Scientists from the Quality Control Unit of the Cashew Export-Promotion Council; Dr. P.R.G. Varma, Principal Scientist, Central Institute of Fisheries Technology; the President of the Consumer Guidance and Research Society of India; The President of the Trivandrum Hotel and Restaurant Owners' Association; the State President of the Kerala State Small Industries Association; President of the District units of the Kerala State Small Industries Association Unit, Executive Committee members of the Kerala State Small Industries Association; the President of the Gandhi Peace Foundation. Kottayam; members of

the legislature, the Press and the Public.

During the discussion it became clear that the implementation of the Prevention of Food Adulteration Act does not attempt to control life threatening bacteriological and chemical substances in food or to encourage good manufacturing practices or monitor the sanitary and hygienic conditions in premises where food is produced, processed and sold - making the food in India, the most unsafe in the modern civilized world. Foods exported from India and meant for consumption in the U.S.A., Europe, Japan and other countries are monitored for these safe food parameters, but as far as the Indian public is concerned the implementation of the Prevention of Food Adulteration Act 1954 is restricted to enforcing 100% compliance with an enormous mass of standards notified under the Act for parameters that are, for the most part, unrelated, or only distantly related to 'safe food' concerns - for example the requirement that milk should contain certain minimum quantities of fat and non fat solids.

These standards are sought to be enforced by a system of end point sampling of finished products by Food Inspectors who send the samples they draw for analysis to State Analytical laboratories by Public Analysts. In cases where the analysis of the sample does not conform to the notified standard, the Public Analyst 'alleges' that the sample is 'adulterated' and the Food Inspector seeks impose on the producer and the vendor concerned, the six month jail sentence mandated in the Act,

by launches prosecution for the sale of adulterated food!!

The largest number of prosecutions are against small producers and vendors of milk for contravening the P.F.A. standard that fresh milk contain 3.5% fat and 8.5% non fat solids. The largest number of appeals under the Prevention of Food Adulteration act in the Supreme Court, most of them unsuccessful, concern contraventions of these standards - though the fat and non fat contents of milk are totally inconsequential to food safety. There is, at the same time, not a single prosecution for the sale of milk contaminated with bacteria or pesticide residues, preservatives etc.

As one speaker pointed out, that there is no assurance that a packet of milk which contains fat and non fat solids as required in the PFA standard is safe !! It could, and probably does contain life threatening bacteria, insecticide and pesticide residues and other substances.

Dr. Anandavalliamma, an F.A.O. Consultant on food safety assurance systems, pointed out that the whole approach of the P.F.A. was basically wrong. The end point sampling of finished products at the retail point, on which the implementation of the Act relies has been shown to be totally ineffective in ensuring safe food. She pointed out that safe food could only be ensured by monitoring the food chain at every point from the consumer, back to the grower and the producer, identifying the points at which life

threatening, chemicals and bacteria could enter the food chain and adoption of government, and industry cooperating in suitable measures, at the critical points during preserving to control contamination.

Speakers during the discussion pointed out that the present system of end point sampling, apart from its ineffectiveness in ensuring 'safe food' expose large number of innocent small producers and vendors of milk and other food products - to prosecution under the Act.

It was pointed out that the contraventions of standards for which many small producers and vendors are prosecuted arise because the Ministry of Health and Family Welfare, Government of India has not fulfilled its statutory obligation to notify the methods of analysis to be used for testing samples for compliance, and to provide access to facilities in which samples can be tested with 100% accuracy.

Many innocent producers are prosecuted because of the defective sampling procedures adopted by Food Inspectors. The distribution of fat and non fat solids in milk is not uniform and milk has to be carefully homogenized before a representative sample can be drawn. Attention was drawn to the possibility of samples failing to conform because the milk had not been properly homogenized before sampling. The CODEX Alimentarius Commission has laid down the international standards for sampling milk in its publication "INTERNATIONAL STANDARDS AND STANDARD

METHODS OF SAMPLING AND ANALYSIS FOR MILK PRODUCTS". However there are no rules under the Act to guide Food Inspectors drawing milk samples - no provisions to ensure that the milk was adequately homogenized before samples are drawn!! As a consequence, many samples fail, and many innocent producers are prosecuted!

The defence in these prosecution is crippled because the Food Inspector while drawing samples does not give the vendor one of the sealed samples he draws, which the vendor can use to ensure that the samples with the authorities are not tampered with and which he can get independently analyzed for his defence. There was such a provision in the original Prevention of Food Adulteration Act, but this was withdrawn during the Emergency in 1976.

Many innocent producers and vendors also face prosecution because the inaccurate and unreliable analysis of samples in State laboratories, which have not been properly activated. The provisions in the Act which sought to ensure the accuracy and reliability of the results of analysis by Public Analysts by enquiring the Central Government to accredit these laboratories and methods of analysis have not been implemented. Dr. Anandvalliamma, a previous Director of the Export Inspection Laboratory emphasized that unless laboratories and the methods of analysis used to analyze samples are accredited and validated by a competent authority, the results of analysis are unlikely to be accurate

or reliable.

Indiscriminate prosecutions multiply because Public Analysts routinely go beyond stating the results of their analysis to allege that the sample is adulterated. The point is that by making this allegation, the Public Analyst preempts the power conferred by Section 20 of the Act on the State Government to apply its mind before giving consent to a prosecution. The discretion of any officer or committee set up by the state government under the authority of Section 20 to apply its mind to all the facts in the case, to decide whether a prima-facie case of adulteration within the complex and ambiguous meaning of the word in the Act, exists and whether it is in the public interest to prosecute, is nullified, once the public analyst sates in writing that the sample he has analyzed is 'adulterated'.

However that may be, the result is that innocent vendors and producers are denied an opportunity to submit explanations before a sanctioning authority, before prosecutions are filed against them based on allegations of 'adulteration' by Public Analyst.

In short, innocent vendors and producers have little chance of escaping the draconian penalties mandated in the Act once prosecution has been initiated, however inconsequential the offenses alleged are in terms of 'food safety'.

The act also denies the Courts to provide justice to these unfortunates by denying the Courts

the discretion to decide penalties in the light of the criminality of the alleged offence, hereby denying justice to the producers and vendors.

It was felt that Director General of Health Services, Government of India should notified under the Act such standards - the contravention of which involves injury to health as to justify a six month sentence.

Parliament intended the draconian penalties mandated in the Act to be used to protect the health and well being of the community by prohebing & the sale of foods containing life threatening substances and not for inconsequential contraventions of rules unrelated to food safety. Parliament certainly did not intend to expose innocent vendors and producers to the draconian penalty mandated in the Act.

Dr. Anandavalliamma pointed out that the objectives of the Act, i.e., ensuring safe food and protecting the health and well being of the community, not be achieved by exclusive reliance on 'end point' testing and the indiscriminate use of draconian penalties as at present.

During the technical session Dr. P.R.G. varma gave a graphic description of the various microbiological threats to food safety. In the absence of Dr. Sivadas of the Spices Board, the meeting was deprived of a presentation on the pesticide residues in food.

Dr. Janardhana Iyer, Retd. Chief Public Analyst described the

procedures followed in the regional Analytic. Laboratory in testing samples for compliance and stressed the importance of safe food and the role the PFA Act could play in ensuring safe food.

Mr. Mani, President of the Consumer Guidance and Research Society of India spoke of the role of the consumer protection organizations in creating public awareness and in exerting the fundamental right of citizens to safe food. He drew attention to the infrastructure facilities, particularly of easily accessible testing facilities where the consumers can get the foods purchase for safety.

Dr. Anandavalliamma stressed that total quality control systems and HACCP procedures would make it possible to ensure safe food even at the level of street vendors with only a minimum reliance on testing facilities and coercion - and that such programmes are effective even in the smallest establishment producing and selling foods.

What emerged from the discussion was the devastating consequences of the health of this county of the failure of the authorities under the PFA to control the content of pesticide and insecticide residues, farm chemicals and other life threatening substances and bacteriological contamination in food.

Specifically the Central Government and the State governments do not use the enormous powers conferred on them by the Act to enforce standards concerning chemical and

microbiological hazards.

The lack of focus on 'safe food' the exclusive reliance on end point sampling of finished products and draconian penalties have done little to protect the Indian citizen from life threatening substances in food which devastate his health. There are practically no prosecutions under the Act for the Sale of foods containing life threatening chemicals and bacteria while on the other hand thousand of innocent vendors and producers are caught up in prosecutions, for the most part on in consequential reason in terms of food safety, that flood the District courts and the Supreme Court.

The President, Trivandrum Hotel and Restaurant Owners' Association expressed keen interest in the food safety assurance systems described by Dr. Anadavalliamma and said his association would get its members to take suitable action.

The Minister Sri V.C. Kabeer and the Secretary Sri V. Vijayachandran pointed out that both the Government of India and the Government of Kerala were seized to the problem and that a committee was studying all related issues and requested that the organizers of this session make recommendation which he could consider.



Minutes of the meeting of the 3rd CO-Ordination Meeting of west zone of All India Food Processor's Association.

Third Co-ordination meeting of

West Zone of All India Food Processor's Association was held in MAIDC's Board Room at Rajan House, 3rd Floor, Prabhadevi, Mumbai-25 on 23rd of June 2000 at 15.00 hours. The agenda item for this co-ordination meeting is enclosed for ready reference.

Since Mr. L. K. Shah felt that all the items except the item at Sr. No. 3 to be kept for discussion when Mr. Bijay Kumar, M.D. MAIDC, resumes the meeting.

During last meeting members had expressed desire to have inter action with some Sr. Sales Tax Official about various components of the Sales Tax commissioner to address the members. However, he deputed Mr. Mathane, Asstt. Commissioner Sales Tax. Mr. Mathane explained the members various State Policies relating the Sales Tax and also explained the details about the various components being charged as Sales Tax. All members were satisfied about the various components being charged as Sales Tax. All members were satisfied about the element of Sales Tax being charged on Food Products.

Mr. Bijay Kumar late occupied the Chair and explained that the members have to pay very active role in strengthening the zonal activity at Mumbai. This could be possible because the infrastructure required for maintaining the office of the AIFPA's West Zone has already been offered by Ex Zonal Chairman in the office of MAIDC at Rajan House Prabhadevi, Mumbai - 25.

Mr Bijay Kumar explained the role of MAIDC in growth of Food

Processing Sector in the Western Zoinc.

He further added that despite creation of Food Processing Ministry, there is very little growth of the Food Processing Sector in the country in general an State of Maharashtra in particular. MAIDC has therefore taken an active role in phasing out creation of a Food Park at Butibori at Nagpur where the infrastructure such as cold storage, warehouse, ETP, communication, tetrapack facility would be created to be offered to Food Precessors who would be setting up their factories in the vicinity of Food Park consisting of 100 afcfres of land.

For promotion of Food Processing Industries four Regional Workshope were organized by MAIDC on dates and venue mentioned below:

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2.	Poona	5&6.2.2000	MIT
3.	Ratnagiri	5.5.2000	Dapoll
4.	Aurangabad	18.5.2000	Walmi

Based on issues identified, following infrastructural supports are proposed to be promoted.

a) MAIDC is looking for creation of Cashew nuts processing facilities in the region of Konkan by collecting raw Cachewnuts from growers and process the same for getting Cashew Kernels, and explore the possibility of getting a better quality of Cashew Kernels for a better export price.

b) Working on creation of a packhouse in Tasgaon area being a major grape growing belt. The facility created would utilize low grade grapes for its conversion in to resins and will also handle uniform

colouring and grading of the resins for better market & price for the product.

c) To create pack house in the Banana growing area to handle ripening and grading of Bananas for getting better and additional market for the fruit.

d) We are looking for creating facility of packhouse in the area of Marathwada for handling Mosambi which is produced on very large scale to get the fruit properly sorted, graded, degreened and packed to attract better market potential.

e) Management informant system for Horticulture produce - basic raw material of processed food.

f) Ressource survey of Konkan, Marathwada and Vidarbha
In the last Zonal meeting of AIFPA following study groups on following topics were constituted.

a) Databank of resource for processing be created.

b) Model project to be prepared.

c) Restructuring of GoM Schemes

d) Suggestion about Got (MFPI) Schemess.

No report of study groups received so far.

Issue to be taken in next meeting - problems relating to Excise duty, pending clearance with FPO.

After this, the meeting was concluded by vote of thanks by Mr. Amar Pandy, Co-ordinator for West Zone of All India Food Processors' Association.



Agreed Minutes of The Third India-Korea Trade Ministers' Meeting (Joint Trade Committee) May 9, 2000, New Delhi, India

The Third India-Korea Trade Ministers' Meeting was held in New Delhi, India on May 9, 2000. The Korean delegation was led by H.E. Dr. Han Duck-soo, Minister for Trade, and the Indian delegation was led by H.E.Mr. Murasoli Maran, Minister of Commerce and Industry. The Korean Minister was accompanied by a business delegation. (A list of both countries' official delegates is shown in Attachments A & B).

The head of the Korean delegation made courtesy calls on H.E. Mr. K. R. Narayanan, President of the Republic of India, Mr. Pramod Mahajan, Minister of Information Technology, Mr. Ram Vilas Paswan, Minister of Telecommunication and Mrs Vasundara Raje, Minister of State for Small Scale Industries.

Both heads of the delegations agreed to designate Mr. Choe Jong-hwa and Mr. S.M.Acharya as their respective Co-chairman.

I. Bilateral Trade and Investment Review.

1. H. E. Dr. Han Duck-soo, Minister for Trade, mentioned in his opening address that despite the economic crisis in the Asian region, the two-way trade volume between India and Korea has gradually increased since the Second Trade

Ministers' Meeting. According to the Korean statistics, the two-way trade volume has marked an annual increase of 4.1% from \$1.9 billion in 1995 to \$1.9 billion in 1995 to \$2.1 billion in 1999. The Korean Minister added that the trade volume would further increase, if both governments make concerted efforts to pursue an open market economy.

2. The Korean Minister expressed his appreciation for the recent import liberalization measures taken by the Indian government, which remove all of the 1,429 items subject to quantitative restriction by the end of March 2001, and also expressed his hope that the measure will substantially contribute to consolidating their bilateral trade relations. The Korean Minister further noted that Korean investment in India has marked a significant increase from \$180 million in 1995 to \$830 million in December 1999, bringing Korea to one of the largest investor nations for India, and that it will continue to increase in the years ahead thanks to the economic recovery of the two countries. In order to bring about a further substantial increase in bilateral trade and investment, the Korean Minister proposed to enhance cooperation in such promising areas as software and information technology.

3. H.E.Mr. Murasoli Maran, Minister of Commerce and Industry reviewed the results of the Second Trade Ministers' Meeting and expressed hope that the two countries would reach the desired target of US\$ 5 billion of bilateral trade. One significant result of the Meeting was the conclusion of the Investment Protection Agreement signed in February 1996, which has provided the framework for the protection of investment activities in both countries. The Indian Minister also commended the great achievement of the Korean people in overcoming the economic crisis.

4. The two Ministers agreed that both governments should intensify cooperative efforts to expand their bilateral trade volume and to improve market access for products of interest to each country. These bilateral efforts should be undertaken in a manner complementary to the WTO efforts to liberalize world trade.

II. Trade Promotion

1. Stressing the need to further expand the bilateral trade volume in a more balanced manner, the Indian side sought Korea's cooperation in broadening and diversifying its export items to Korea. In particular, the Indian side expressed strong interest in expanding exports of items such as rice, fresh fruits, seafoods,

spices and essential oils, oleoresins, sesame seeds, dyes, pharmaceuticals, auto components, iron and steel and manganese ore.

2. Noting that the trade imbalance which increases significantly during Korea's economic crisis, began to narrow down in 1999, the Korean side suggested that it would be more desirable to seek the trade balance by further increasing the trade volume. The Korean side took note of the Indian requests on the items mentioned above.
3. The Korean side expressed its concern that the level of tariff rates on such export items of interest for Korea as electronics, chemicals and general machinery still remains high, ranging from 25% to 35% despite continued efforts made by the Indian government to reduce tariff rates. It further noted that surcharges, additional duties, and special duties are being added on these products. The Indian side responded that it would take into account Korea's concerns in its tariff restructuring process.
4. Noting that the use of various import restrictive measures such as anti-dumping duties, countervailing duties and safeguard measures has increased on Korean products since 1998 by the Indian government.



Minutes of the 3rd Executive Meeting of the Association held in the Board Room of MAIDC, Krishi Bhawan, Goregaon (East) Mumbai at 11 am, on 30th June, 2000.

The Meeting was Chaired by Sh. Gokul Patnaik, President of the Association.

Those who attended the meeting appended their attendance in the sheet enclosed. The leave of absence was granted to the members who could not attend.

Shri Patnaik while welcoming the members complimented the role of all officers and staff of MAIDC and in particular Sh. Bijay Kumar, Managing Director and Sh. A.M. Pandey in organising this meeting even after serious handicaps of time due to Maharashtra State Governments' pressure of work on hand during this period. Sh. Patnaik also thanked MAIDC for successfully organising T.Q.M. workshops wherein quality control managers from the food processing factories in Maharashtra attended this workshop. The object of the workshop was achieved since the participants vowed to implement the Total Quality Control Management Systems in their organisations which was the objective assigned by the Secretary, Department of Food Processing Industries that small scale industries should start adopting Quality Systems in the entire factory operations so that they can aim to adopt higher standards like HACCP

and ISO 9000 series and complete with the large producers of the world.

The discussion on the agenda items was taken up.

1. The minutes of the meeting of the second Executive Committee held on 6th March, 2000 were adopted with unanimous voice vote.

2. Proposal to setup Food Testing Laboratories was discussed in detail and it was finally decided that the food testing laboratories may be set up in order of priority as below;

1. **Mumbai:** In collaboration with MAIDC at Goregaon in Krishi Bhawan. The initiative will be taken by Sh. A.M. Pandey and the funds requirement will be worked out for efforts to raise funds.

2. **Nagpur :** In collaboration with Vidarbha Economic Development Council "VED" Nagpur, Sh. Ashok Bhiwapurkar will work-out the modalities. A copy of the model project report was supplied to Mr. Ashok who promised to work out financial details and send a scheme workable with "VED". It was also proposed by MAIDC that the Lab may be provided space facilities in Noga factory, if need arises.

3. **Baroda :** Sh. Vijay Shah proposed that he will explore the possibilities of

establishing a lab at Baroda which will be in Collaboration with GIRDA an organisation of the State Government. Sh. Rajesh Shah will send a paper working out feasibility of the proposal.

4. **Pune :** Dr. V.V. Karnik and Sh. Pradeep Chordia were requested to take up the task at a existing suitable place. Sh. Chordia said that Agriculture Department of the State Government and Maharashtra Chamber of Commerce at Pune will be approached for this project. Dr. Karnik promised to come back with a proposal of the value.

President wanted an early proposal from the joint team of Dr. Karnik and Chordia.

President while summing up the discussion desired a very time bound action taken for all the four proposals. It will be desirable to have the primary work to be completed in 3 months time.

Sh. J.S. Srivastava proposed that the association should have minimum 25% share in participation and all these labs should be accredited with CSIR.

President pointed out that this is a initiative for national network of Laboratories in all cluster of Industries and the results of the Labs should be the same in a uniform format designed for this purpose.

Dr. V.V. Karnik suggested that

there was a need for a lab in Ratnagiri. President suggested that no sooner we complete the first phase, we will plan the second phase identifying other locations.

3. Setting up of a website AIFPA

President briefed the members that the association is in the process of developing a portal site with lots of data management and high usage sight. 'DANCO' and organisation of information technology has proposed to undertake this project without financial liabilities to the association. This site would contain a password protected area for the members. Every member will be given a unique user ID and secret password to login the restricted area. All the information to be displayed to the members only ;can be kept in this area. The members can host their own pages once AIFPA assignment is executed. The members can take advantage of this site free of charge. However, members own initiatives for ;advertisement and other requests will be chargeable.

The members deliberated on ;this proposal and unanimously ;commanded the efforts. President assured to complete the project in shortest possible ;time.

4. Corporate membership proposal was discussed at length. The list of member for West Zone was gone through in detail. It was decided that Sh. A.M. Pandey, Sh. Pradeep Chordia and Dr. V.V.Karnik ;will make special efforts to persuade Industries in Pune and ;Bombay Region. Sh. Rajesh Shah will work

in Gujarat and will take help from Sh. Rajesh Gandhi and Mr. Piruz Khambatta. Besides, in Nagpur region Shri Ashok Bhiwapurkar will make efforts. President informed that letters to industry members have gone as from him. However, personal efforts are required from all of us to collect funds for taking up new projects by the association.

A list of identified members is ;enclosed as discussed in the meeting. It was briefed that Dr. A.G. Naik Kurade has proposed that a fund raising programme may be ;undertaken other then enrolling corporate members. President had requested him to himself draw out a programme of action and execute for which members will extend full support.

5,6,7. The members wanted time on issues relating to draft National Policy paper, W.T.O. discussion paper and Diagnostic Tool for Quick Productivity Appraisal (QAP) in Fruits & Vegetable Processing Industry.

President requested a quick feed back on these issues so that our comments may be sent to concerned authorities within specified time.

8. Members were briefed about issues relating to Codex, BIS and Notifications received from PFA. It was decided that the comments received from panel of experts of ;the association may be finalised and our observations forwarded to concerned authorities.

Sh. Ashok Bhiwapurkar suggested that all imported goods

must be made costlier than Indian processed food stuffs by raising duties. The industry can feed cost of production data for various products. Sh. L.K. Shah proposed that products violating PFA should not be allowed to be sold in Indian market. However, PFA and other food laws may be upgraded and liberalised.

Sh. Rajan Kanai, Parle Agro informed that the use of stabilisers is declining in imported food stuffs.

Sh N.M. Kejriwal informed that the Department of Food Processing Industries is organising a few Seminars to elicit comments of the industry to finalised 'National Plan' AIFPA may undertake to sponsor this work in one or two places since they have the infrastructure for holding seminars and workshops.

Sh. A.M. Pandey in the end presented pouquets to Sh. Gokul Patnaik. Sh. N.M. Kejriwal, President (CIFTI) and Sh. Butola, Dy. Director (F&VP), Sh. Pandey informed that Sh. Bijay Kumar was to honour the dignitaries. However, sudden engagement with the Minister has made it difficult for him to come. Sh. Patnaik thanked Mr. Bijayu Kumar, Managing Director, MAIDC for this excellent gesture and complimented MAIDC for full support.

Sh. Pandey invited Members for a lunch hosted by MAIDC.

Meeting ended with thanks to the Chair.

K.P. Sarin
Executive Secretary



NEWS ROUND UP

Low volume of produce hits NE food-processing industry

Lack of volumes in horticultural produce and the poor quality of the semi-processed products have hampered the development of the food-processing industry in the North East. Attempts to set up modern largescale processing industries of global standards have failed as a result.

One such attempt by corporate giants Hindustan Lever Limited (HLL) recently, to set up processing unit based on orange or tomato has been aborted. High prices of the products have also proved to be a deterrent.

According to the Guwahati field officer of the Agricultural and Processed Food Products Export Development Authority (APEDA) Sri Bidyut Baruah, an official from Jalandhar representing HLL had been here recently to explore the possibility of setting up a modern processing unit in the region incorporating latest technology and standards. He had to go back disappointed with the lack of competitive pricing and quality of the two products in question, along with the low volumes.

According to Baruah, the region has a surplus in tomato to the extent of 1,74,402 MT (98-99), which sounds impressive. But, compared to

the requirements of HLL, it was barely enough. The multinational's tomato processing unit at Jalandhar, for example, processes 735 MT of the crop each day.

But, it is not only the quantity that has deterred the HLL. The high prices have also proved to be equally disheartening. Baruah said tomato is supplied to the company's Jalandhar unit at Rs. 1.75 per kg whereas prices here are much higher.

A ray of hope, however, persists in view of the fact that the crushing of tomatoes in Jalandhar is done during April-July while here it is harvested between January and March. HLL might try to take advantage of this factor.

The viability of processing orange was also within the purview of HLL but here too the problem was similar. According to Baruah, HLL is sourcing orange concentrate from Nagpur at Rs. 5 per litre. No one has as yet explored the possibility of making use of the good orange produce in the region by setting up a concentrate unit which could have fetched good returns for the cultivators. Even if there were it is doubtful whether HLL would have utilised the produce considering the fact that hygienic standards in the food-processing sector is not up to expectations.

"The HLL official during his visit had interacted with a large

number of horticulturists and food-processors suggesting ways and means of improving quality and reducing costs. Baruah informed that the visiting official also offered suggestions on making technological improvements.

The Assam Tribune 31.03.2000



Small - scale sector feeling the heat

With many items reserved for the small scale sector going into the open General List, the sector is feeling the heat. The sector, which claims to generate employment for six crore people, accounts for 40 per cent of GDP and contributes 60 per cent of the total exports, may face competition from the imports in various segments.

Major items reserved for the small scale sector include consumer goods made of plastic, handloom items, pickle, pappad, laundry soap and potato chips, among others. Many multinational companies have already stepped into marketing of these products, claimed to be produced by small scale, cottage, tiny industries.

Among the items now put on OGL include pickles, paste and chutnies made of chilli, mango, tomato lemon, tamarind, squash of mango, lemon, orange and pineapple, plastic imitation jewellery

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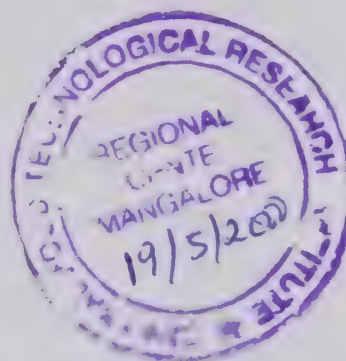
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Union Budget for 2000-2001 spells deathknell for Food Processing Industries

Food Processing Industries have all along been highlighted as a "Sunrise" Industry by the Govt. of India, which set up a separate Ministry over a decade ago to give proper thrust to its development. But, for the past couple of years, there appears to be doublespeak, as what one arm of the Govt does, the other arm does not know or is ingoring the importance of this Sector, as a result of which it will face "Sunset" before long. There is absolutely no co-ordination between the various wings of the Govt.

The Union Budget presented by the Finance Minister on Feb 29, 2000 is a case in point as it has a great adverse impact on the Food Processing Industries. At a time when the Industry has been making several representations for removal of the existing Excise Duty of 8% on most of the processed foods, it is really regrettable that the Finance Minister has chosen to increase it to 16% without any logic whatsoever. Processed foods like squashes, fruit juices/drinks, jams/jellies/marmalades, sauces/ketchups, biscuits etc are no longer foods for the elite but have become basic necessities of middle class people. Working women who are increasing in number in all urban locations cannot afford to spend a lot of time on cooking and as such, have to resort to use of processed foods due to their convenience and ready availability. Biscuit consumption is common even in the remotest corners of the country. The low and middle classes will therefore be hit very hard by doubling of the excise duty on processed foods.

The revenue authorities and the Finance Minister seem to be influenced with the single point agenda of increasing the revenue without following any logic. Fruits and Vegetables are highly perishable and the postharvest losses amount to 20% to 40% valued at Rs. 50000 crores per annum. Fruit and Vegetable preservation by converting them into processed products is therefore an extension of horticulture and helps reduce the losses. The Industry is playing a pivotal role in this regard. It also offers good employment potential. As such, processed foods should not attract any duty or taxes. This important aspect has been totally lost sight of by the Govt. in recent years even though in the liberalisation era, Dr. Manmohan Singh had rightly exempted processed fruits & vegetable products from excise levy.

Another setback facing the Food Industry is due to the recent attempt to introduce uniform sales tax all over the country. Many of the processed foods which earlier attracted only 4% S.T. have now been brought under 8% and 12% slabs, which will also lead to increase in consumer prices. The adverse impact of increase in Cenvat (central value added tax) and uniform sales tax will mean decrease in demand of processed foods in the coming months. Many of the small processing units will become unviable and have to close down sooner than later. It will be a deathknell for the Food Processing Industries.

The Finance Minister, in his budget speech hopes for a growth path of 7 to 8% per annum and spells out the strategies as (i) strengthening the foundations of growth of our rural economy, especially agriculture and allied activities and (2) strengthening and modernising traditional industries such as textiles, leather, agro-processing and the SSI Sector. In total contrast to this, he has imposed higher levels of excise duty which will defeat the above objectives.

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ASSOCIATION NEWS

Minutes of the meeting of the First Executive Committee Meeting held at 3. P.M. on 8th Feb., 2000 in the Conference Hall of Consultancy Development Centre (CDC) Zone IVB, IIInd Floor, India Habitat Centre Lodi Road, New Delhi - 110 003

The meeting was chaired by the President, Sh. Gokul Patnaik. The list of the members who attended is enclosed. Leave of absence was granted to those who could not attend.

President welcomed the members and called the meeting to order.

The following Agenda Issues were taken up.

1. Organisation Chart for 1999-2000 was approved. It was also decided that Chapters at Indore, Siliguri, Gauhati, Bhubaneswar, Chandigarh, Jaipur and Panipat may be started. It was felt that the Chapter at Patna needs to be strengthened.

President proposed that three panels may be formed to handle issues relating to Food Laws/Standards/Policy and to attend the meetings in various departments of the Government and other related organisations in the Centre, while the state meetings will be attended to by the Zonal/Chapter Chapter Chairmen and the experts listed by them. The panel details are enclosed as Annexure 'A'.

Sh. D. S. Chadha stressed that issues of the industry being common they may be discussed

with CII and other organisations and unanimous views may be sent to the concerned departments.

Sh. Laljit Singh, Dr. A.G. Naik Kurade, Sh. N. M. Kejriwal, Sh. J. S. Srivastava, Sh. D.S. Chadha and Sh. P.L. Kaul participated in the discussion.

2. Progress about the workshops on T.Q.M. was given to the members. The workshop at Chittor was held on 28th Jan, 2000 where around 40 industries participated. Workshops at Krishnagiri and Nagpur have been fixed for 19th Feb., 2000. At Krishnagiri, Sh. P.T.Raju, South Zone Chairman is organising the workshop and at Nagpur it is being arranged by the Chapter Chairman, Sh. Ashok Bhiwapurkar.

Those who participated in the discussion included Mr. Laljeet Singh, Dr. Naik Kurade, Dr. S. Jindal, Mr. R. L. Chhopra, Sh. B. L. Kapoor and Sh. P. L. Kaul.

3. Setting up of a Food Testing Laboratory by the Association.

The proposal was very much accepted by everyone. It was decided that a Committee may be formed under the Chairmanship of Sh. N. M. Kejriwal to take decisions on major issues such as location of

Lab., funding aspect, assistance from various departments besides other modalities to draw out a plan of action. The names of committee members decided were Sh. P.P.S Dhillon, Dr. S. Jindal, Sh. D. S. Chadha, Dr. A. G. Naik Kurade, Sh. B. L. Kapoor, Dr. S. K. Saxena, Sh. P. L. Kaul, Sh. S. K. Verma and Sh. J. S. Srivastava.

President desired that the report by this Committee may be made by 31st March, 2000.

4. Annual programme for holding Executive Committee meetings.

The following schedule of meetings was proposed:

1. February - Delhi
2. March - Delhi (mainly to discuss Budget Proposals in the first week of March during AHARA, 2-6)
3. April - Bangalore
4. July - Bombay
5. September - Calcutt
6. December - A.G.M. (venue to be decided)

However, it was decided that for final dates, Zonal Chairmen may be consulted. The first budget meeting at New Delhi was fixed for 6th March, 2000 at 3 p.m. at any convenient venue.

5. Zonal/Chapter Meetings Committee Meetings to be held quarterly.

It was the consensus that local problems of the Industry may be discussed in these meetings and seminars at state levels may be organised involving State government and Local Administrative Bodies. Zonal and State Chapters must send their Annual Plans for State Level execution.

6. 'Outstandings'

A Committee under the Chairmanship of Sh. N. M., Kejriwal with President, Vice-President and Past President as members was formed to activate membership of the association and for creating a corpus fund for the association. Special role of Zonal/Chapter Chairmen is sought in this effort.

President and Vice-President were requested to ensure collection of membership dues and improve the health of "Indian Food Packer".

However, it was decided that regular reminders may be sent to defaulting members. Zonal and Chapter Chairmen are requested to kindly approach members in their respective Zones/Chapters.

It was also proposed that the help of Director, F&VP may be taken for this purposes.

7. Codex

It was decided that the committee formed for Codex may meet and discuss with the Director in Dept. of Food Processing

Industries about the details of this proposal and funding aspects to accomplish this work.

8. Strategy for Union Budget 2000

President briefed the members about the meeting with the Secretary, Food Processing Industries and the efforts being made in the Ministry of Finance in this respect.

9. Reaction to Uniform Sales Tax Proposals.

Dr. S. Jindal was advised to analyse the sales tax issue and take up at Central and State levels this important element which is going to affect the calculations of the VAT System.

10. Approach to Duty Drawback issues.

A committee under the chairmanship of Sh. R.L. Chopra was formed to work out the duty drawback rates for 2000 in collaboration with APEDA. Sh. Chopra was requested to co-opt need based members to this committee.

11. Any other points to be raised with the permission of the Chair.

It was decided that a committee under Ms. Shashi Arora may be formed to develop a Women Entrepreneurs' Cell wherein eminent Women experts may be made members to assist Women Entrepreneurs in Food Processing. The likely names of the members were Dr. Lakshmi Devi and Dr. Vijay Sethi etc. The committee will draw out an action

plan for this year and put up to the Executive Committee.

Meeting ended with thanks to the Chair and to CDC for providing all assistance to hold the Executive Committee Meeting.

Members were invited for tea.

(K. P. SARIN)

Executive Secretary

Annexure 'A'

Panel of Experts to attend to various issues relating to Food Laws/Standards/Policy.

1. Food Laws Panel (FPO, PFA, CCFS, W&M etc.)

Sh. P.P.S. Dhillon
Dr. A. G. Naik Benerjee
Dr. S. Jindal
Dr. A. K. Bhatia
Sh. B. L. Kapoor
Dr. J. C. Anand
Dr. G.M. Tiwari
Sh. S. N. Mahindru
Dr. Kunal Benerjee
Sh. D. S. Chadha

2. Food Standards Panel (BIS, Codex etc.)

Sh. P.P.S. Dhillon
Sh. S. K. Verma
Dr. A. G. Naik Kurade
Sh. D. S. Chadha
Dr. S. K. Saxena
Dr. A. K. Bhatia
Sh. Kunal Banerjee
Sh. S. N. Mahindru
Sh. Rajan Kanal

3. Food Policy Panel

Sh. Gokul Patnaik
Dr. S. Jindal
Sh. N. M. Kejriwal

Sh. J. S. Srivastava
Sh. S. N. Mitra
Sh. Piruz Khambata
Sh. P. P. S. Dhillon
Sh. Rajesh Bagga



A presentation made to Hon'ble Shri Dhananjay Kumar, Union Minister of State for Finance

by Gokul Patnaik, President,
All India Food Processors' Association,
New Delhi.

Economic Review 1999-2000 28th Feb. 2000-Horticulture

- The Horticulture sector, which includes a wide variety of crops such as fruits, vegetables, spices, plantation crops, floriculture, medicinal and aromatic plants, cashew, etc. is recognized as an important sector for potential diversification in agriculture.
- India accounts for 10% of world production of fruits crops and mango, banana, citrus, apple, guava, papaya, pineapple and grapes, account for the bulk of fruit production.
- India is also the largest producer of vegetables, next only to China with an annual estimated production of 185 million tonnes in 1998-99, including potato production of 32.5 million tonnes.
- Horticulture products are highly perishable and suffer heavy damage and deterioration in quality during post-harvest handling.
- Post-Harvet handling accounts

for 37% of the losses and different stages of storage, grading, packaging, etc.

Economic Review 1999-2000 - Processing

- Value addition in perishable product is possible through processing, preservation and cold transportation. The current installed capacity of fruit and vegetable processing industry is very limited.
- The utilisation of current processing capacity of fruits and vegetable works out to approx. 1.80% of the total production of fruits and vegetables in the country.
- Installed caqcapacity for processing is still very low and its utilisation is even lower and needs to be augmented.

Finance Minister's Budget Speech - 29 Feb. 2000

"I propose to put India on a sustained, equitable and job-creating growth path of 7 to 8% per year in order to banish the scourge of poverty from our land within a decade. The next 10 years will be India's decade of development."

Main Elements of the Strategy:

- Strengthen the foundations of growth of our rural economy, especially agriculture and allied activities.
- Nurture the revolutionary potential of the new knowledge-based industries such as infotech, biotechnology and pharmaceuticals
- Strengthen and modernize

traditional industries such as textiles, leather, agro processing and the SSI Sector.

Budget Proposals

- Excise duty on all processed food items including those from perishable horticulture products doubled from 8 to 16%.
- Total burden of duty on pan masala, aerated water and tobacco products kept at 40%.

Only items exempted from excise duty

- Roasted chicory
- Specified cold chain equipment
- Excise duty to be charged on transaction cost (MRP).

1 Duty abatement as a percentage of retail sale price increased marginally from 35 to 40% in some items.

1 Exemption of income tax on export income reduced by 20%.

- Only small units upto Rs. 50 lakhs annual turnover exempted from Excise duty.

Impact of Budget on Processed Food Industry

- Increase in prices of all processed food items across the board from 15 to 20%.
- Most food processing units, currently making marginal profits are likely to become unviable.
- Domestic industries may be unable to compete effectively against imported goods in most sectors.
- High tax rates likely to lead to

temptations for tax evasion.

Impact of Budget on Farm Sector

Depressed demand from processing industry likely to have adverse impact on prices of agricultural raw materials.

Wastage currently estimated at over Rs. 50,000 crores likely to go up.

Adverse fallout may affect:

- large number of women employed in traditional food processing industries

- rural development

Impact of Budget

- An example of *aachar, chutney and murabba* Industry:

Year	Central Excise	Sales Tax	Total
Prior to 1.3.97	NIL	4-8%	8%
1.3.97	8%	4-8%	16%
1.1.2000	8%	12%	20%
1.3.2000	16%	12%	28%

In addition, there are other local levies like octroi (3-4%), turnover tax, entry tax, etc.

The cascading effect takes the overall tax burden to almost 35%.

Our Humble Request.....

Exempt excise duty on all processed food products based on perishable agricultural raw materials.

Reduce excise duty on other staple food products to current level of 8%.

Reconsider norms of duty

abatement on MRP on the basis of actual ex-factory cost of products.

Likely Financial Impact

Less than Rs. 50 Crores
(As per budget estimates)

Likely Benefits

Boost to the rural economy,

Increase in percentage of processing of horticulture and other perishable products

Better price to the farmers

Generation of rural employment opportunities, particularly for women.



Workshops on T.Q.M. System

All India Food Processors' Association is organising a series of Workshops on "T.Q.M. System" in different parts of the country for the benefit of small scale food processing units with the support of the Dept. of Food Processing Industries, Govt. of India. The importance of "T.Q.M. System" and application of HACCP (Hazard Analysis and Critical Control Points) are essential to ensure the production of good quality finished products so that the consumers are fully satisfied. "T.Q.M. System" consists of continuous improvement in quality of the 3 'Ps', namely, People, Product, and Processes. It is an important organisational approach involving every one from top to bottom. Proper maintenance of sanitation and hygiene of the premises, plant and machinery and personnel working in the unit also

assume great importance in ensuring Total Quality. So far, three workshops have been conducted by the Association at Chittoor, Nagpur, and Krishngiri. The reports of these workshops are given below.

1. Report on the "Workshop on TQM System" organised at Chittoor on 28th January, 2000.

The workshop on Total Quality Management System was organised at Chittoor (Andhra Pradesh) by A.I.F.P.A in collaboration with the Chittoor District Fruit Processors' Federation, the Units of which are mainly processing mango (Totapuri variety). Shri Balakrishna Reddy, President of the Federation had taken a lot of interest and had made all arrangements for conducting the one day workshop on 28th January, 2000.

Thirty six representatives of the Fruit Processing Industry participated in the workshop.

The faculty for the workshop composed of the following:-

1. Dr. S.K.Saxena, Director, FRAC, New Delhi.
2. Dr. M.S. Narayan, Scientist, CFTRI, Mysore
3. Mr. Kawale, Director, BIS, Hyderabad.
4. Mr. Devendra Prasad, APEDA Office, Hyderabad.

The Programme started at 11a.m.

After the welcome speech by Mr. Balakrishna Reddy and introductory remarks by Mr. P.T.Raju, General Manager, Tropical Fruits International, Bangalore and

the Chief Editor, the speakers presented their papers along with slides/transparencies emphasising the importance of TQM and HACCP and the various essential points to be followed by the Industrial Units to ensure production of good quality products. After presentation of each paper, there was an interesting discussion when there was a lot of interaction between the delegates and the faculty.

Mr. Verma, Sr. Inspecting Officer, F.P.O. from Madras Office also participated in the Workshop.

In the concluding session presided over by the Chief Editor, Mr. K.L.Radhakrishnan, there was an open house discussion when the industry representatives raised some of the problems/issues faced by them.

APEDA provides some subsidy for construction of "Ripening sheds" in the case of fresh fruits exporters. Delegates wanted that similar subsidy should be extended to processing units also as ripening sheds are a part and parcel of the whole processing of mango fruits.

Another issue was about the Bank Guarantee being insisted upon for loans being given by the Ministry of Food Processing Industries and APEDA for putting up Effluent Treatment Plants in the processing units. Participants stated that as the Banks invariably ask for full amount to be deposited with them for issuing Bank guarantee, the loan facility becomes redundant. They wanted that instead of individual Bank

guarantee, group guarantee by canners can be considered.

The above aspects need to be taken up with the concerned authorities. Mr. Balakrishna Reddi has been requested to send a brief on the above issues.

The programme which was very effective and fruitful concluded at 5.30 P.M.

2. Report on the "Workshop on T.Q.M. Systems" held on 19.2.2000 at Central Agmark Laboratory, Nagpur.

The workshop was organised by AIFPA in collaboration with the local chapter of Nagpur. About 25 representatives of the Food Processing Industries located in and around Nagpur participated in this workshop. This workshop which is one among the series being organised by AIFPA has been supported with financial assistance by Department of Food Processing Industries.

After the welcome address by Mr. Ashok Bhiwapurkar of B'Kar Products, Nagpur and introductory remarks by Mr. K.L.Radhakrishnan, Chief Editor, "Indian Food Packer", the workshop was inaugurated by Mr. Kumar Bhatia, Chief Engineer and Director, Department of Food Processing Industries, Govt. of India. Mr. Bhatia emphasised the importance of Total Quality Assurance and application of HACCP in food processing Units without which the consumers' interests will not be protected.

After the inaugural session, there was detailed presentation of papers

on T.Q.M. by Dr. S.K. Saxena, Director, FRAC, alongwith slides/transparencies. Another paper was presented by Mr.T.M.Mazumdar, Director & Welfare officer, Bureau of Indian Standards (BIS), Nagpur. There was good interaction between the participants and Speakers.

Dr. P.K.Jaiswal, Director, Central Agmark Laboratory, Nagpur also spoke about Quality Standards.His staff demonstrated simple techniques of detection of adulteration in foods.

3. Report on the "Workshop on T.Q.M. Systems" held on 19.2.2000 at Krishnagiri, Tamil Nadu.

The workshop was organised by AIFPA in collaboration with the Dharmapuri District Fruit and Vegetable Processors' Federation, Krishnagiri, on 19.2.2000.

Mr. Venkataswamy, President of the Federation welcomed the gathering and Mr. P.T.Raju, Chairman, AIFPA (South Zone) delivered the inaugural speech.

The technical session was started at 12.00 noon with the presentation by Dr. Mridul Salgame, Director of FRESH on T.Q.M. System. This was followed by the presentation of Ms. R. Kalpana who is the Additional Director of Bureau of Indian Standards, Bangalore on HACCP and the procedures and formalities to get the certification along with its advantages.

After the lunch break, Mr. Devendra Kumar of APEDA, Hyderabad summarised the schemes of financial assistance by APEDA

for implementation of T.Q.M. and certification of HACCP or ISO. This was followed by a lecture from Dr. Ramchandra, Professor and Head of the Regional Research Institute of IHR on pesticides and pesticide residues in finished products.

Mr. Acharya represented the F.P.O. office in the Southern Region and he explained the importance of TQM and how the FPO can help the processors to achieve the GMT within the specified structure of FPO.

Mr. Raju later summed up the presentations of the day. Mr. Thimma Chetty of balaji Foods delivered the vote of thanks. The Programme concluded at 4.30 p.m.

It was an excellent workshop useful to the Krishnagiri Processors and the participation of about 50 delegates proves that the processors had taken a lot of interest and our Chapter Chairman, Mr. G. Venkataswamy and his colleagues had the best of co-operation and response in organising the programme.

The Association has planned to organise similar workshops at Baroda and Trivandurm.



PRESS RELEASE

Union Budget For 2000-2001

The manufacturers of processed foods have denounced the Union budget proposals for 2000-2001 as a retrograde step. They have said that the impact on enhancement of

excise duty on processed foods from 8% to 16% will further cripple the Industry at a time when the Indian market is being flooded with imported processed foods. It will also make most processed foods beyond the reach of the common consumers.

Mr. Gokul Patnaik, President, All India Food Processors' Association (AIFPA) said here today that the Food Processing Industry, which was earlier described as a 'Sunrise' industry is now facing a 'sunset'. He said that it is well-known that although India is the second largest producer of fruits and vegetables in the world, only less than 2% of the produce is processed and the post-harvest losses amount to over Rs.50,000 crores per year. He said that under these circumstances, Finance Minister should have taken steps to encourage food processing which was the only solution to reduce the post-harvest losses and to stabilise the prices of the agriculture commodities, thereby giving benefit to the farmers.

Mr. Patnaik said that the burden of taxes in India on processed foods as well as packaging was the highest in the world. Apart from the Central taxes, most of the State Governments have also tended to put heavy taxes on these goods as they are wrongly considered to be luxury items. The burden of purchase tax, sales tax, octroi duty and other cesses levied on agriculture commodities are already very high and with the increase in Central excise duty to 16%, the total burden on taxes on some

processed food items will now be well over 50%. This will cripple the food processing industries and as a result, post-harvest losses will mount up still higher. Because of the perishable nature of the raw materials used in the industry such as fruits, vegetables, dairy and other animal products, the depressed demand may cause hardship to the farmers and may force them to resort to distressed sales.

It may be recollected that Dr. Manmohan Singh in his budget proposal for 1991-92 had withdrawn excise duty on processed food products to give a massive thrust to the development of the Food Industry. As a result, a number of new food processing units came up during the years 1993-94 and 1994-95 and the production of processed foods went up by 23% and the industry enjoyed excise duty exemption for 5 years. In latter years however, excise duty was levied at 8% which led to adverse impact on Food Industry leading to decline in production.

Repeated representations were made to the Government to totally remove the excise duty which fell on decades of years. Now, sadly enough, the Finance Minister has jacked up the Excise Duty from 8% to 16% which is a most retrograde step. It is feared that the current budget proposals may make many food processing units unviable and force them to close down.

The AIFPA has requested the Prime Minister and Finance Minister to reconsider the budget proposals and to withdraw excise duty on processed food products.

TQM WORKSHOPS



Mr. K.L. Radhakrishnan, Chief Editor, "Indian Food Packer" addressing participants of TQM Workshop at Chittoor



A view of participants at Workshop at Chittoor



Mr. K. Bhatia, C.E. & Director (F&VP), MFPI inaugurating the Workshop on TQM at Nagpur



A view of participants at the Workshop at Nagpur



Mr. P.T. Raju, Zonal Chairman (South) addressing delegates at TQM Workshop at Krishnagiri (T.N.)



Mr. Devendra Prasad of APEDA addressing the delegates of TQM Workshop at Krishnagiri (T.N.)

ROUND TABLE ON THE "WHITE" CHALLENGE

India has become the largest producer of Milk in the World with 74 million tonnes per annum. The problems facing India's Dairy Industry due to International competition were discussed at the Round Table Conference held on 18.1.2000 at New Delhi. Shri Sompal, Member, Planning Commission delivered the Chairman's address. Shri P.P.S. Dhillon, Past President, AIFPA participated in the above conference.

Consequent to the liberalisation of import of Agriculture commodities and products in April 2000 as per WTO Agreement, India will face severe competition in the Milk Products trade. The conference discussed the International challenge and various options before the Indian Dairy Industry to face the challenge.



Shri PPS Dhillon, Past President of AIFPA participating in 'Round Table on the white challenge on 18th January 2000 in New Delhi.



Shri Som Pal, Member Planning Commission delivered the Chairman's address.

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NEWS ROUND UP

Units for Making Low-Cost Instant *Sambar* Mix commissioned

Sambar forms an important part of diet in South India. *Tur dal* constitutes a major ingredient of *sambar*, although in certain regions horsegram and green gram are also used in place of *tur dal*.

The Central Food Technological Research Institute (CFTRI), Mysore, has developed a low-cost instant *sambar* mix using defatted soya flour and successfully field tested it in the traditionally *sambar* consuming southern states of the country, under a UNDP-funded project.

The development of the instant mix was preceded by an extensive survey of the food habits concerning the consumption of *sambar*, including the sensory qualities, in low-income households, for deciding the majority preference. The *sambar* mix developed by the Institute takes into account the findings of this survey. A process for the commercial manufacturing of the mix (500 kg/shift/day) has been also standardized. Four trial plants have been commissioned and 45 personnel trained in rural areas of Karnataka, Tamil Nadu and Andhra Pradesh. The mix was distributed in the region for evaluation of consumer acceptability. The product has been well received by the consumers.

The successful integration of defatted soya flour in a traditional Indian recipe like *sambar* not only promises a low-cost and nutritionally better convenience food for the benefit of poor, but also paves way for better utilization of soya flour.

CSIR News

30-7-99



CFTRI Mini *Dal* Mill - 100 units installed in rural areas

The small-scale pulse processing unit, popularly known as mini *dal* mill, developed by the Central Food Technological Research Institute (CFTRI), Mysore, is being propagated in the rural areas for the benefit of farmers and small entrepreneurs, under a UNDP programme. So far, one hundred units have been distributed under this programme to selected beneficiaries including NGOs and village cooperatives in seven states. The institute has also provided training to personnel for these organizations in the operation of the mill.

Developed under the National Technology Mission on Oil Seeds and Pulses, the mini *dal* mill is a compact unit which can dehull the conditioned pulse and separate the husk and the brokens from clean *dal*. The unit runs on a single 1hp

motor and can process 100-120 kg pulse in an hour. Pulses like Bengal gram, peas, soybean and *tur* can be processed using this mill.

CSIR News

30-7-99



Chilean Avocado Exports are expected to increase by 200% during the present season and earn US\$ 50 million in foreign revenue. Although the area planted to avocados has expanded by more than 1000 hectares during the present season, yields are set to fall and production for the 1999/2000 season is forecast to drop by as much as 40%. This is expected to reduce the shipments by 25000-35000 tonnes. Chile produced a total of 75000 tonnes of avocados in 1998 worth \$60 mn, of which just under \$50 mn (44000 tonnes) were exported, mainly to the USA. The total volume exported was treble that of the 1997/98 season

Agribusiness Report Sept.-Oct.99



Mango Production in Israel is expected to reach 25000 tonnes in 1999/2000, up 20% from the previous season. The country is expecting tough competition on the European markets, mainly from India and Southwest Asia. These

countries are expected to send large quantities of mangoes to Europe including several varieties not grown in Israel. Shipment of Israeli mango kicked off in late July, with exports continuing until mid-october. The main markets are France, Holland, Germany, Austria and Scandinavia.

Agribusiness Report Sept.Oct.1999



India's cumulative spices export during April-August 1999 registered an increase of 4% in rupee terms and 1% in dollar terms, despite a 7% decrease in terms of quantity. A total quantity of 92,055 tonnes worth Rs.775.5 crores (\$ 180.34 millions) were exported during the first five months of the current fiscal as against 98,558 tonnes worth Rs. 742.19 crores (\$179 millions) during the previous year. Pepper topped the list by contributing 47% of the total export earnings followed by spice oils and oleoresins (13%) and chillies (13%). Pepper, chilli and curry powder dominated both in terms of value and quantity. However there was a decline both in terms of quantity and value in ginger, coriander, cumin, celery, fennel, fenugreek, other seeds, garlic and spice oleoresins and other oils.

Agribusiness Report Sept.-Oct.99



Decision on challenging U.S. Patent deferred

A high-level-inter-ministerial meeting discussed the issue of whether or not to challenge the

recent U.S. Patent on anti-diabetic formulations based on brinjal, bottle gourd and jamun but deferred a decision.

According to highly placed sources, the meeting, which was chaired by the Secretary, Department of Science and Technology, Prof. V.S. Ramamurthy, postponed a decision pending further details on the commercial implications of the patent, which has been granted to three American scientists. The meeting, the sources said, was of the view that though the patent was very weak and could be successfully challenged without any problem as in the case of patent that was granted by the U.S. Patent office earlier for using turmeric for wound healing, no purpose would be served by doing so unless it had commercial implications for the country either now or in the future.

The meeting reviewed the data collected so far in this regard and it was found that the information available was not adequate to arrive at a clear-cut decision on whether or not to challenge the patent. It was resolved that more information be collected and that the final decision be deferred until then.

The meeting, which was attended by the Director General, Council of Scientific and Industrial Research, Dr. R.A. Mashelkar and the Industry Secretary, Dr. S. Narayanan, among others, also reviewed the mechanism that was available for storing of knowledge with regard to drugs in the indigenous systems of medicine

and it was decided that steps be taken to set up a computerised data base of all Indian medicinal plants, so that in future there was absolutely no scope for such patents to be granted.

It was agreed that while protecting India's traditional knowledge, it was essential that the 'line of control' was not left vague, but defined precisely so that there was no 'incursions from outside'.

Indian Food Industry Sept.-Oct.99



Food Standards Committee directs Labelling of all Foods

The Central Committee for Food Standards has stipulated that packages of all food items containing meat-based products or eggs as ingredients should be labelled "NV" (non-vegetarian).

While, thus far, food companies have proudly described their products as "100-per cent vegetarian", if this new provision comes into force, food companies will, perforce, be pushed to classify their products either "V" (vegetarian) or "NV". It is also proposed that a separate symbol and colour code be devised to differentiate between food items comprising non-vegetarian ingredients from food items comprising only vegetarian ingredients. A draft notification regarding the labelling of food packages is expected to be issued soon and after receiving comments and feedback to this draft notification, the government will

issue a final notification, following which the new provision will come into force.

The move to label food packages in this particular manner follows a recommendation by a committee constituted by ministry of food and consumer affairs under the chairmanship of Ms. Maneka Gandhi. The committee was formed to examine proper labelling of food, cosmetics and medicines packages for indicating whether the contents are vegetarian or non-vegetarian. Ms. Gandhi was of the view that when a consumer buys a product, he has no idea whether the ingredients contain matters of vegetarian or non-vegetarian origin. As almost 50 per cent of the country's population is vegetarian, non-declaration of information regarding non-vegetarian content on their packages was considered to be unfair.

It was also pointed out that the US, with a 11 per cent vegetarian population was giving this information to the consumers. The Maneka Gandhi committee also felt that labelling of a product "V" or "NV" would result in consumer pressure on the manufacturers to make substitutes for non-vegetarian ingredients. Such changes had been observed in other countries, the committee said.

The existing provision of labelling of food as provided under rule 32(b) of PFA Rules, 1955, stipulates declaration of the name of ingredients used in the product in descending order of their composition by weight or volume as the case may be.

The rule also states that whenever gelatine is used as an ingredient, a declaration to this effect should be made by inserting the word "gelatine, animal origin".

The label of packages weighing 20 gram or less are exempted from such stipulation.

Indian Food Industry Sept.-Oct. '99



Danisco Joint Venture to make Food Flavours

Danisco Ingredients India Private Limited, the Indian arm of \$3 billion Danish food conglomerate Danisco A / S, has established a joint venture in India with the Shiv Jatia group in which Danisco Ingredients (DI) owns 74 per cent equity and Mr. Jatia retains the rest 26 per cent. The total paid up capital of the company is \$1 million. The company will produce and sell flavourings to food producers in the country and will also use India as an export base for Nepal, Bhutan, Bangladesh, Sri Lanka and Maldives. Initially, the company will produce only favours at its plant and other ingredients will be imported from its parent company. The executive vice president of DI, Dr. Frederick Geji Hansen said that the Indian market was different from the European market for flavourings and ingredients, while the managing director of the Indian venture, Mr. Neil Prasad said that India is the world's third largest food producer and only 25 per cent of food products undergo industrial processing. However, percentage is

increasing and by the year 2010 India is expected to be among world's five leading producers of industrially processed food products. "Therefore our targeted customers in India will range from bakery, confectionery, dairy, ice cream, pharmaceuticals and distilleries (MFL) as well as major international food processors like Nestle and Unilever, to small one man business down country", he observed. In India, the company would be providing emulsifiers, stabilisers, functional blends, flavours, enzymes and antioxidants. The company would source 60 per cent of the raw material within the country while 40 per cent of the ingredients would be imported.

Indian Food Industry Sept.-Oct. '99



Vinegar

Vinegar is used on the table to flavour and acidify food and also to preserve food. It finds commercial use in the manufacture of pickles, sauces, etc. Vinegar is a natural fermented product known to be produced from suitable raw material of vegetable origin by alcoholic and acetous fermentation. Brewed vinegar is a product derived from alcoholic and acetous fermentation of any suitable medium, such as fruits, malt, molasses and sugarcane juice. Synthetic vinegar is a substitute for vinegar, prepared by dilution of acetic acid, which is not the product of alcoholic and acetous fermentation. The Bureau of Indian Standard has formulated an Indian Standard IS 14703 : 1999 on

'Vinegar-Specification' to provide guidance on the quality of production of both brewed and synthetic vinegar. It is based on CODEX STAN 162- 1987 'Codex Standard for Vinegar', published by the joint FAO/WHO Food Standards Programme, Codex Alimentarius Commission, Rome.

In the preparation of this standard, due consideration has been given to the provisions of the Prevention of Food Adulteration Act, 1954 and the Rules framed thereunder, Fruit Products Order, 1955 and the Standards of Weights and Measures (Packaged Commodities) Rules, 1977. However, the standard is subject to the restrictions imposed under these, wherever applicable.

Vinegar shall be a clear liquid, free from cloudiness or suspended particles. It shall possess the characteristic taste and odour of the raw material from which it is produced. It shall be free from sulphuric acid or any other mineral acid and added colouring matter except caramel. Vinegar shall also meet the requirements given in the Standard, which include minimum limits for total acid content and maximum limits for metallic contaminants.

In brewed vinegar, when malt is used as a medium, it shall have at least 0.05 percent of phosphorus pentoxide and 0.04 percent of nitrogen.

Vinegar shall be free from micro-organisms capable of development under normal conditions of storage; shall not

contain vinegar eels or substantial quantities of other suspended matters and sediments; and shall be free from turbidity caused by micro-organisms (mother or vinegar); and shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

The product shall be prepared in accordance with the hygienic practices prescribed in IS 2491:1998 'Food hygiene - General principles - Code of practice (second revision)'. Vinegar shall be packed in a suitable container which does not affect the quality of the product. The information to be marked on the package shall include: the name and address of manufacturer; net contents in volume (ml/litres); date of manufacture; batch or code number indicating date of manufacture; the kind of medium for preparing brewed vinegar; the term 'Synthetic vinegar' for vinegars prepared by dilution of acetic acid and the statement 'prepared from acetic acid'; the words 'Best before.....' (Month and year to be indicated); and any other information as specified under the Prevention of Food Adulteration Rules, 1955 and Standards of Weights and Measures (Packaged Commodities) Rules, 1977.

Standards India

Oct.99



Food Irradiation Controversy

Despite a phenomenal increase in Agricultural productivity over the years, harvest losses caused by

pests and micro-organisms continue to substantially reduce the benefits of the increased food output. Of course, many post harvest preservation techniques have been perfected for the purpose of long-term food preservation.

Food irradiation involving the treatment of food with energy from gamma rays and X-rays, that destroy pathogens, to increase the shelf-life of food has emerged as one of the most effective methods of food preservation.

Today, food irradiation is widely used to conserve a variety of commodities including pulses, cereals, spices, fruits, sea food, dairy products and meat.

Experts point out that irradiation can ensure hygienic quality food by destroying dangerous pathogens and parasites. More than 40 countries around the world today use irradiation on a commercial scale for preservation of commodities.

As a researcher working for the Mumbai-based Bhaba Atomic Research Centre (BARC) says, "Owing to the emotional sentiments attached to radiation and related issues, no other food processing technology has been studied as thoroughly and extensively as food irradiation."

He is of view that as in the case of initial resistance to milk pasturisation, consumer acceptance of food irradiation is expected to be a gradual process, facilitated through a sustained information campaign.

The Government of India has already permitted irradiation of onion, potatoes and spices for consumption in the domestic market as well as for exports. Farmers, traders and exporters have all evinced a keen interest in making use of the potential of irradiation for food processing.

Of course, the setting up of facilities for irradiation involves a huge capital investment. BARC has already developed and scaled up the technology of food irradiation for commercial application. For many years now, the technique of irradiation has routinely been used for medical equipment sterilisation. Meanwhile, an irradiation facility for processing spices is coming up at Navi Mumbai.

Health activists and environmentalists have expressed severe opposition to food irradiation on the ground that it is harmful to human health. A British food irradiation expert is of the view that irradiated food may still contain many harmful micro-organisms.

Dr. C Gopalan, an Indian nutritional expert, is in concurrence with this view. Interestingly, a study carried out by the Hyderabad-based National Institute of Nutrition (NIN) had reported that polyploid blood cells, associated with leukaemia, were formed when irradiated wheat was fed to under-nourished children.

But subsequent studies have found to disprove this thesis. The Mumbai branch of the Indian Medical Association (IMA) has

pleaded for a ban on the use of irradiated food on health grounds. But experts from FAO, WHO and International Atomic Energy Agency have all approved the use of irradiated food. Studies carried out by experts of these organisations have shown that the consumption of irradiated food in no way poses a health threat. Right now, owing to the limited application of irradiation technology, food items subjected to radiation processing are likely to be a little expensive in comparison to non-irradiated food. But with technology upgradation, the cost of irradiation is all set to fall.

The Observer

10-11-99



Adulteration goes unpunished

Though laws have been passed to prevent adulteration of food, drugs, cosmetics and insecticides, convictions under these statutes are few and far between. Tardy enforcement of the legal provisions, corruption and slow prosecution and trial are some of the causes for this state of affairs. Three cases under the Insecticides Act decided by the Supreme Court in recent weeks show how difficult it is for the prosecution to get a conviction unless they are extremely alert at every step (*State of Haryana vs Unique Farmaid Ltd.*).

In these cases, samples of insecticides were taken from shops which, after tests from the quality control laboratory, were found to be misbranded. Prosecutions were launched before the chief judicial

magistrate. The manufacturers challenged these in the Punjab & Haryana high courts alleging that they had been denied a chance to get the samples tested at the Central Insecticides Laboratory as they were summoned by the criminal court after the expiry of the life of the insecticides. The high court accepted their defence and quashed the prosecutions. The government moved the Supreme Court against the acquittals, but the appeals were dismissed.

The Insecticides Act, the Drugs and Cosmetics Act and the Food Adulteration Act have provisions which prescribe standard procedures to be followed by the inspectors when samples are taken for analysis. One sample has to be sent to the analyst, another given to the person from whom it is taken and another should be kept for production in the court. The sample may be sent to the central laboratory in case the first report is challenged by the accused manufacturer. The second report shall be final in a court of law.

The problem most often is that the first report takes too long to come by though the law allows two months, and by that time the expiry date of the drugs or insecticides might have expired. In case of food, the sample might have deteriorated so much that another test by the central laboratory is impossible in most cases. The inspecting authorities are not known for their promptness and the analysing laboratories are also not epitomes of efficiency and exactitude.

On the other hand, the accused have been given ample protection. They can ask the court to get the sample tested by a central laboratory to make sure that it was indeed adulterated or misbranded. This takes more time while the sample deteriorates further. Ultimately, the prosecution falls through.

In the present case, the accused contended that no action was taken by the Insecticides Inspector to have the sample retested from the Central Insecticides Laboratory in terms of their request and by the time they were asked to appear in the court to stand trial, the shelf life of the chemicals had already expired. They were thus deprived of their valuable right to defend themselves. Against such strong defence, the state government could not produce any arguments.

Delay on the part of the statutory authorities have been fatal to prosecutions involving adulterated food and drugs also. In *Calcutta Municipal Corporation vs Pawan Saraf*, decided earlier this year, the Supreme Court quashed the prosecution because the report of the central laboratory was incomplete in details. The report of the central laboratory is final regarding the complaint and it even replaces the earlier analyst's report. Therefore, prosecution can be quashed if the central laboratory report is defective. In *Municipal Corporation of Delhi vs Ghisa Ram*, the curd sent for second and final opinion from the central laboratory was returned stating that it was highly decomposed. The accused was acquitted on that ground.

The story of prosecutions under the Drugs & Cosmetics Act is also not very different. Unless the enforcing machinery is revamped to make it more efficient and the loopholes in the decades-old statutes are plugged, the rate of prosecutions under these vital laws will be low and the market will be flooded with spurious commodities.

Business Standard 10-11-99



New policy on Food Processing by Fiscal end

The Government is likely to come out with a new Food Processing Policy by the end of this fiscal. The package is currently being worked out in consultation with the industry and the Prime Minister's Office.

Stating this on Wednesday, Minister of State for Food Processing Industries Syed Shanawaz Hussain said, "One of the major threats which Indian companies will have to face is from imported food items.

Under WTO arrangement one cannot stop the inflow of products from other countries by imposing legal restrictions. Every policy measure must be justified on socio-economic and scientific grounds. Therefore, one should work towards harmonization of the rules and regulations with those under the new world trade order."

Hussain was speaking at a seminar on 'Food business and opportunities under the new world trade order' in New Delhi on

Wednesday.

The Minister said that while the pertinent WTO agreements in force recognised the right of member countries to adopt measures deemed necessary to safeguard their health, the rules were vague and allowed the possibility of using health standards as non-tariff trade barriers.

Thus attempts have to be made to ensure that food safety norms do not serve as trade barriers, intended or unintended, he said.

It is definite that from the policy making and regulation point of view, stricter food regulations will emerge in international market and they will force more challenges to domestic Industry.

Thus, the responsibility and accountability of manufacturers will go up because of increasing consumer pressure groups, he said.

Financial Express 2-12-99



Quality vital for Exporting to UK

India will have to concentrate on upgrading the quality of its fruit and vegetable produce to make a headway in the UK markets, according to Mr. Barry Linton, Export Technical Advisor, Head of Operations Branch, Ministry of Agriculture, Fisheries and Food (MAFF), the UK.

Mr. Linton said the complete chain of production from harvest up to the consumer level would have to be addressed to effectively

tackle the quality issue.

Most supermarkets deal directly with suppliers, and these set high standards not just on the quality of produce but also the presentation. "They are severe task masters," he added.

Currently, the UK imported a wide range of fruits and vegetables from more than 40 countries. Some of the important sources are Africa, West Asia and Latin America. India's share in this trade was small, he said.

Mr. Linton was speaking to presspersons at a mango processing unit at Sathyaveedu, Chittoor district. Andhra Pradesh, organised to coincide with the visit of an MAFF team to the facility. The processing unit has been promoted by the Chennai-based Kiran group, a leading player in chemical sector. For the Kiran group the mango processing unit represents a foray into horticulture.

With a turnover of Rs. 100 crores, the group is a leading manufacturer of silicates with a 20 per cent market share and trader in bulk chemicals.

The group has promoted Capricorn Food Products India Ltd. (CFPIL) for setting up the 20 tonne per hour mango pulp manufacturing facility.

According to Mr. Rahul Jain, Managing Director, CFPIL, in its first season of operation (March-June 1999), the facility has processed 2,800 tonnes of mango and achieved a turnover of Rs. 4 crores.

The equipment could process pulpy fruits such as mango, guava, tomato and papaya and pack them in tin cans and consumer packs. The unit could produce puree, juice, ketchup, jam and snack foods, he said.

Business Line

6-12-99



Monsanto keen to get approval for aspartame products in Jams

Monsanto Enterprises Ltd. part of the multinational seed giant Monsanto Corporation, which established operations in the country last year in the nutrition and food sector, is working hard to get approval from the PFA (Prevention of Food Adulteration) department for introduction of aspartame products in jams, juices, candies, ice-creams etc.

Aspartame is a sugar substitute used worldwide in many food products, though in India it is currently used only in Diet Pepsi and Diet Coke.

The product which is a combination of amino acids aspartic acid and methyl ester of phenylalanine is currently under a cloud with much negative publicity given in the web.

Speaking to The Financial Express, market development manager Gaurav Chaudhary said that this was a misconception that needed to be corrected with due facts gathered from research.

"As long as levels of average daily intake (ADI) are maintained, aspartame ingestion was harmless,"

he said. According to FDA standards, 20 cans of Diet coke could be consumed to reach ADI maximum, but even FDA deliberately understated the risk by 100 per cent to ensure absolute safety, he said.

Monsanto is now working with a number of players in the food processing industry such as jam manufacturers, candies etc to help them use this as a sugar substitute."

With Aspartame we can ensure consistency and quality as well as lower calories unlike sugar, but we have to work on costs with our customers," Chaudhry said.

Monsanto has an R&D facility in Singapore where product developments using aspartame takes place. This technology is passed on to food processing industry in related products.

The PFA apparently has formed a sub-committee to look into the applications filed by Monsanto along with its future partners and a decision in the matter could be expected in the early part of 2000.

Financial Express

7-12-99



Centre mulls alterations in PFA Act to push Exports

PS Bhatnagar, Secretary, Department of Food Processing Industries, says the government is contemplating a change in the PFA (Prevention of Food Adulteration) Act to enable the food processing industry to tap export markets.

Delivering the inaugural address

at FoodPro '99, an exhibition-cum-seminar organised by the Confederation of Indian Industry (CII) here yesterday, he said, although the World Trade Organisation promises a liberalised trade regime, it is rather vague about specifying health standards.

This allows the possibility of potential importers erecting non-trade barriers in the form of health standards.

The other aspect of this would be the increased responsibility and accountability that manufacturers have to live with. In the domestic market, it will mean that there can be no legal restriction on imported food and local manufacturers will have to work towards improving quality and delivery systems.

It will also be in the interests of processed food manufacturers to harmonise quality standards between countries. This way, they need not cater to differing standards for different markets which will go a long way in reducing costs.

The government, says Bhatnagar, is also in the process of formulating a national policy for the food processing industry.

Based on the report submitted by the Murari Committee which was asked to look into all aspects of the food processing industry and suggest ways to overcome critical problems, the government is to initiate dialogue with industry associations.

Two areas of focus will be infrastructure and ways to improve financing to the industry. Although

food processing industry has been classified for priority lending by banks, this has not solved the problem of adequate funds for the industry. To become competitive and exploit overseas markets, it is imperative for the industry to reduce costs by improving technology and reaping the benefits of economies of scale.

The food processing industry will grow from its current \$7000 crore size to \$14,000 crore by 2005. The opportunity is therefore huge especially because there is a direct correlation between increasing income and the consumption of processed foods.

Business Standard 8-12-99



APEDA plans more Vapour Heat Treatment plants

The Agricultural Produce and Processed Foods Export Development Authority (APEDA) has plans of putting up vapour heat treatment plants in Mumbai and Chennai following the successful usage of the Delhi facility.

APEDA earlier was more tuned into exports to the CIS countries and West Asia but is now going all out to develop the US and European markets where norms are more stringent. To conform to the US and European requirements of vapour treating fruits to kill fruit flies, these facilities are coming up across the country.

APEDA has also helped farmers implement techniques in their fruit farms which would elicit a longer

shelf life from those products. Earlier fruits such as lychees, mangoes, pomegranates were air freighted on account of their perishability. Now more and more fruits are sent by sea as they are able to withstand freshness for a month resulting in better earnings for farmers.

The organisation had embarked on a number of training programmes for farmers using the expertise of senior experienced people in the field from universities. After the training, these technical consultants are expected to do a follow-up with the concerned farmers on a regular basis to ensure implementation.

The effect of three years of such programming and implementation is seen in the quantum jump of exports of fresh fruits - a 13.56 per cent increase in April-July '99 over April-July'98 and a 110 per cent increase in processed fruits and juices for the same period. Even though exports of fresh vegetables did not show an increase, processed vegetable exports went up by 19.57 per cent. The integrated training focus is gathering momentum in the country. In Tamil Nadu APEDA has established a virtual office and tied up with the state government to offer similar services.

In Bangalore training is given in cultivation of export-specific grapes, in UP for mangoes and lychees and in Bihar for lychees.

Financial Express 8-12-99



Solutions for value loss and poor supply chain Management

HLL's Zahura lessons

India has lots of foods to be processed. Yet the Food Processing Industry is slow to take roots. According to Ashok Savant, Divisional Manager, Hindustan Lever Research Centre, Bangalore, this is mainly due to poor consumer understanding, poor choice of technology and poor raw material supply.

Considerable integrated research has to be done on raw material supply, the consumer and production and distribution technology. In his presentation on 'Unlocking the vicious cycle of inefficiencies, value loss and wastages', at the Foodpro he explained the lessons HLL has learnt from Zahura, Punjab in contract farming and processing of tomatoes.

The Zahura journey, he said began with evaluation of 50 new varieties for three years, climate studies, applied research and constant interaction with farmers and participative experimentation.

After these high-yielding varieties of tomatoes were introduced with supporting inputs, technologies and services like supply of disease-free seedlings, credit facilities, free production implements, quality offices closer to farms, supply of crates and tarpaulins, rural based payments etc. the company's efforts paid in per acre increase in yield from eight tonnes in 1991 to 20 tonnes in 1999.

Savant listed the five lessons the company has learned from making such experiments successful: demonstrate continuously to initiate change, establish quality parameters early, incorporate a range of relevant inputs, build trust of the farmers.

He said the government should step in and finance mechanical harvestors, introduce crop insurance with subsidised premia, give subsidy on crates, provide land for R&D, finance innovative projects, permit import of organic compounds and establish accountability to contract farming.

Financial Express

8-12-99



Integration must to achieve full potential

Indian Food Processing Industry has to get its act together in terms of integration of supply-chain management, distribution and exports if it aspires for a bigger slice of the domestic and international markets.

Airing this view Hans Hannart, Managing Director of Rabo India Finance Ltd. said for India to aim for becoming the food factory of the world, a process which may take full 10 years, larger companies need to get involved in organising the integration of the sector.

Speaking at FoodPro'99, Hannart said many companies were focussed on the high growth segment of the food processing industry like fruits and vegetables, dairy, animal feed and poultry,

wheat milling & processing and beverages (including tea and coffee). But linkages with farmers and export markets are insufficient at present. Many big companies are already into providing inputs like pesticides and fertilisers but are slowly getting involved in the processing side as well. But many intermediate companies in the processing chain take away a lot of money and so value addition does not get reflected in either for the processing company or its products.

Hannart spoke of the need for larger companies getting involved and bringing integration into the food chain. More auction centres and modern fruits and vegetable markets were required to get products at reasonable prices. Also agri-business is not just for multinationals and many domestic companies which are expanding can position themselves for global markets. A heartening development is the emergence of retail chains and food service companies but it was extremely important to bring about changes in consumer behaviour to processed foods.

Outlining the present state of food sector in the country, Hannart said with the exception of tea accounting for 25 per cent of world output, India was lagging way behind in other key areas like milk, sugar, fruits and vegetables and rice.

Despite the noticeable shift from subsistence to basic foods in the country, India is at the bottom globally in many sectors like fruits and vegetables, dairy products. In

sugar the industry is fragmented and average capacity per unit is very low. If the industry with its status of second largest producer in the world has to make any mark in global markets, India should be exporting sugar and not import it. For this to happen changes in regulations have to be made so that consolidation can take place.

In milk too India is one of the largest producers but only 20 per cent of 80 million tonnes is processed. Most in the country are still consuming liquid milk. A major problem is consistent procurement of quality milk. Also not enough chilled environment is available to preserve quality of milk by the time it gets to the processing unit. More cold chains ought to be established and the supply chain needs to be properly organised. The country also is the second largest producer of fruits and vegetables in the world but globally it is at the bottom. A revamp of supply chain and aggressive export marketing are needed. In edible oil the raw material supply is inadequate while excess crushing capacity exists. This has resulted in large imports. In poultry, the consumption compared to international standards is very low. It can catch up by ensuring availability of good feed grains and revamping the retail system.

Financial Express 8-12-99



Call to adopt new Cold Storage Technology

Technologies in the existing

and new cold storages in the country should be modified to increase their energy efficiency and reduce operating costs, Mr. P.S. Bhatnagar, Secretary to the Department of Food Processing Industries, said here today.

Delivering the keynote address at the inaugural session of the two-day Foodpro '99 international conference being organised by the Confederation of Indian Industry-Southern Region (CII-SR), Mr. Bhatnagar said cold storages set up during the eighties were generally having the "diffuser cooling system", which consumed more power in comparison with the "gravity" or "fin-coiled" cooling system. Priority should be given to changing the cooling system in the old units to reduce electricity expenses by 20 to 25 per cent.

Mr. Bhatnagar said new technology like Pre-fab Sandwich Insulated Panels might be adopted for construction of new units, which could help in effecting better efficiency, low maintenance cost and saving in construction time.

The Secretary pointed out that normally cold storages in India were based on the vapour compression refrigeration system but the other system of vapour absorption refrigeration, based on solar and biogas energy, had been adopted in advanced countries.

Highlighting the opportunities for Food Processing Industries in the country where at present wastage occurred in every stage of the food chain, Mr. Bhatnagar said the biggest problem faced by

processors was in respect of availability of raw material from farmers who tended to divert their crop to the open market when prices were attractive. The problem was very acute in the horticulture-based industry.

"To ensure that the right quality and quantity of raw material is available to the processors, the most suitable method in the Indian context appears to be to procure the raw material directly through contract farming. My department has been encouraging this concept and has met with partial success. Experience has shown that more than a contractual obligation, it has to be a willing cooperation between the farmers and the processors", Mr. Bhatnagar said.

Counselling greater use of radiation technology for preservation of food items, he said the Bhabha Atomic Research Centre (BARC) had done extensive work on preservation of foods by radiation. The Department of Food Processing Industries was encouraging entrepreneurs to set up facilities for radiation processing of food.

The minimum cost of a radiation processing plant had been estimated by the BARC at Rs. 7 crores. Besides his department, financial assistance for this purpose was also available from APEDA (Agriculture and Processed Foods Export Development Authority), Small Farmers Agri Business Consortium and the Department of Science and Technology (DST). The "overwhelming consensus" of the scientific community was that

radiation produced safe and nutritious food when carried out in accordance with the specified standards.

Mr. Bhatnagar said under the WTO, no country could stop the inflow of products from other countries just by imposing legal restrictions. Every policy measure must be justified on socio-economic and scientific grounds.

The Hindu

8-12-99



Phdcci advises Punjab on Food Processing

The PHD Chamber of Commerce & Industry has submitted a note to the Punjab government making a number of recommendations for integrated development of food processing and agro-based industries in the state.

The note was presented to the government recently by Phdcci president Ashok Khanna. The note said fresh fruits and vegetables for the agro-processing units can be improved if proper drainage system is developed and the dependence on rain is minimised.

The range of horticulture produce should be diversified and supply of quality seeds of exportable products should be ensured.

Development of effective backward linkages through captive or contract farming is important. The land ceiling laws should be suitably amended so that the benefits of modern and large-scale farming are available to the farmers.

The cold chain needs to be developed along with the other infrastructure facilities, it said.

Economics Times

9-12-99



Policy Panel on Food Processing set up

The Union Minister of State for Food Processing, Mr. Sahanabaz Hussain, has said a committee, headed by the departmental secretary for formulating a policy for the growth of food processing industry in the country, has been set up.

He told presspersons here that the major thrust areas of the proposed policy would be to give an impetus to the food processing activity, to ensure remunerative prices to the farmers and generation of job opportunities for the youth.

He said the Ministry would also hold a seminar on the subject in January next year, which would be attended by the national and international experts. The centre has provided Rs.58.5 lakhs for setting up 23 food processing training centres in the country.

Mr. Hussain said there was scope for setting up Food Processing Units as only 1.8 per cent of total fruits and vegetables were processed in the country. He said he had received 42 proposals from Bihar so far with an investment of Rs. 287 crores providing jobs to 4,787 youth.

Business Line

9-12-99



Backward linkage in Food Processing Sector

The Union Minister of State for Agriculture Mr. S.B.P.P.K. Satyanarayana Rao, has called upon the Food Processing Industry to practise backward linkage on a wider scale and also to go in for more contract farming.

Delivering the valedictory address at the two-day Foodpro '99 conference here on Wednesday, Mr. Rao said that backward linkage can be followed more in the areas of horticulture produce, spices, poultry meat and even specific cereals and pulses.

He said that the system of contract farming was not new in the country and has been in vogue in the sugarcane and tobacco sectors. In the milk sector, co-operative and private operations helped increase production and in the oilseeds sector too, activities of the industry has helped raise farm income, he said.

Regarding horticulture produce, poultry and cereals and pulses, Mr. Rao said that the system of backward linkage had not been tried on a larger scale. However, in the last few years, the Ministry of Food Processing Industries has tried to propagate this concept and the system has worked well in many cases, he said.

According to Mr. Rao, the industry has to discuss and negotiate with a large number of farmers to get the requisite quantity of raw materials through contract farming, as farm sizes are small.

This could be done either by direct contract with the farmers, or through co-operatives, he said.

Contract production of raw materials with a large number of farmers will entail some cost to the industry, as the industry has not only to undertake supply of suitable inputs, but also undertake extension work among large number of farmers, Mr. Rao said.

"The cost is well worth it, because a direct relation between the industry and the farm will not only endear the industry to the farming community, but also cut costs, which the industry has to pay to the traders for procuring the raw materials for them," he said.

"The system will help in achieving the objective of increasing farm income, increase investment in agriculture and bring about diversification and commercialisation in the agriculture sector," he said.

On the quality of raw material, Mr. Rao said that though there is a large agriculture base, the availability of the right quality of raw material in sufficient quantities at a reasonable price over a continuing base is still a constraint.

For instance, in the case of milk, the quality problem arises from the level of farmers, particularly hygiene, which results in high bacterial loads and pesticide residues in milk. While some of these could be remedied in processing, some harmful items do get into the processed milk products also, he said.

Mr. Rao said that the quality of agricultural raw material is dependent on planting and breeding material and its husbandry, seasonality and the cost.

Business Line

9-12-99



'Lack of Cold Storage a Major Handicap'

Lack of multi-purpose cold storages at the farm level and distribution is a major gap in infrastructure faced by agriculture and processed food industries, according to Mr. Yashpal Jain, Managing Director, Snowman Frozen Foods Ltd.

While at present the existing cold storage capacity was estimated at about 26 million cubic metres, about 85 per cent was for storage of potatoes. The condition of these facilities was poor, networking was absent, temperatures were not guaranteed and pricing was unpredictable. These factors were not amenable to the development of an organised food processing industry, he said.

Cold store facilities were a key factor in stabilising prices of seasonal farm produce and reducing wastage and quality loss. But there was a lack of awareness regarding the benefits of storage and transportation under temperature-controlled conditions. These facilities could help decrease wastage which were at present estimated at about 30 per cent.

However, the trade itself was lethargic towards utilising chilling

facilities. For example, apples continued to be transported under dry conditions. Traders will have to be encouraged to use temperature-controlled facilities in view of the cost benefit in terms of reduction in wastage and better quality. This would more than compensate the cost of storage, he said.

According to Mr. Jain, nearly 40 per cent of the businesses of supermarket was from processed foods, with a major demand for seafoods and other perishable goods. But the lack of infrastructure was a limiting factor in accessing the domestic market.

Snowman Frozen Foods Ltd. was itself born out of the necessity of its promoters, Amalgam Foods Ltd. and Hindustan Lever Ltd's requirement of cold storage facility to access the domestic market.

Business Line

9-12-99



TN Plans structural changes in Food Processing Industry

Tamil Nadu Government is gearing for bringing about structural changes in Food Processing Industry with a view to removing procedural hurdles, Tamil Nadu Industrial Development Corporation Chairman R Gopalan told FoodPro 99 participants. The government is close to announcing some relaxation in land ceilings for food processing units, especially for fruits and vegetables sector first. Policy has already been relaxed for floriculture. Soon a decision will be taken for taking over government-owned waste lands for horticulture

business, he said while adding that lease of land for food processing business is to be allowed for 10 years.

Financial Express 9-12-99



Task Force on Food Processing Sector to be set up: Hussain

The Ministry of Food Processing Industries (FPI) will set up a task force by January next year to evolve strategies to rejuvenate the industry and double the volume of processed food to 3.6 per cent in the next two years.

"The ministry is in talks with the prime minister and a task force for food processing industries would be set up by January next year." Minister of State for FPI, Shahnawaz Hussain said on the side lines of 55th annual general meeting of All-India Food Processors' Association in Delhi.

The task force would suggest strategies for increasing production of processed food from the present 1.8 percent of total food production to 3.6 per cent, he said. "We are going through the FPI policies of many developed nations right now and the Ministry will frame a comprehensive draft choosing the appropriate policies," he said. Hussain said he was in talks with other related ministries to bring in more departments under FPI's ambit.

"Areas like tea processing, APEDA and other agriculture processing departments are under the commerce or agriculture

ministries, which our ministry is trying to acquire in order to integrate the entire FPI sector," he said.

Hussain said the government would make licensing norms stringent to ensure better quality so that Indian Processed Food got an edge in the international market. The Food Products Order (FPO) which looks into the quality aspects would be provided with extra power to ensure quality he added.

FPI Secretary, PS Bhatnagar, said investment proposals in the domestic food processing sector till September this year was over Rs. 53,000 crore from Indian private and foreign companies. "The Ministry is taking a number of policy initiatives and the transition will attract an additional Rs. 3,000 crore in the coming years," he said. Thrust would be on market research and future product development to boost processed foods production in the country and for its exports. Bhatnagar said.

"Government has launched a concessional financing scheme for post-harvest infrastructure and cold chain packaging," he said. The government has granted approval for 1,100 projects in the FPI sector, including those in export-oriented units (EOUs), joint ventures and 100 per cent subsidiaries.

Financial Express 13-12-99



Prakash Chauhan Bags Kashalkar Award

Prakash Chauhan, Chairman

and Managing Director, Parle Agro Ltd. has been awarded the Kashalkar Memorial Award for 1998 for his efforts to promote fruit drinks in consumer friendly packs. Bestowed on behalf of the All India Food Processors' Association, the Kashalkar Memorial Award is one of the most coveted awards of the Indian Food Processing Industry.

Prakash Chauhan is credited with introducing carton-based packaging in the fruits-based beverage market with the launch of mango drink, Frooti in 1985. The award was conferred on him by Shahnawaz Hussain, Union Minister of State for Food Processing Industries.

Financial Express 20-12-99



Share of Farm Goods dips to 15% of total Exports

The share of agricultural exports in India's total exports has steadily been declining over the last three years.

This is despite the government's claim that a push is to be given to agricultural exports to enable India to compete in the international market in the post-WTO free trade regime.

The total agricultural exports have declined from 17.96 per cent of national exports in 1996-97 to 15.93 per cent in 1997-98 and further down to 14.57 per cent in 1998-99.

What's worse, exports of marine products, poultry and dairy

products as also fruits and vegetables from India have taken a beating with the share of exports both in quantity and value terms dropping in 1998-99 compared to that of 1997-98. India is among the top three producers of all these products.

Interestingly, during the same period, the share of agricultural imports in total imports has increased.

Agricultural imports that were down to 4.03 per cent in 1996-97 went up to 4.63 per cent in 1997-98 and still further up to 6.44 per cent in the last financial year.

While import of foodgrains went down, the import bill increased on account of sugar and edible oil imports in 1998-99.

The value of marine product exports has come down to Rs. 4,367.96 crore out of the total national exports valued at Rs. 1,41,603.5 crore in 1998-99. This is as against Rs. 4,486.7 crore in 1997-99 for marine products out of a total export earning of Rs. 1,30,110.64 crore.

Similarly, poultry and dairy product exports were valued at a low Rs. 98.96 crore in the last financial year over Rs. 118 crore in 1997-98. The only minor increase happened is in the export of processed vegetables and fruit juices.

Share of agricultural exports rose to 17.96 per cent in 1996-97 after going up from 13.37 per cent in 1994-95 to 16.45 per cent in 1995-96 per cent of the total

exports.

In fact, in 1996-97 from the time India started freeing agricultural products from quantitative restrictions, things were looking good for the country as exports were on the rise. The United Front government at the time decided to target agricultural export earnings at 30 per cent of the total exports for the country. But that figure was never realised. In fact, agricultural exports have been on the decline since then.

Agricultural economists have said that it is in India's interest to go for liberalisation of agricultural commodities and at the same time give agricultural exports a major thrust. Rice (basmati and non-basmati), marine products and poultry and dairy are some of the export areas where India can score well and bring in valuable forex for the exchequer.

Economic Times 20-12-99



Mushrooms have a great future

Mushroom consumption is on the upswing the world over. It is not merely because it is a nutritious, low-calorie health food deemed good for heart and blood pressure, but also because it is an ideal taste-enhancing companion of other foods in most vegetarian and non-vegetarian recipes. However, in India, the graph of mushroom's popularity is not following the global trend though it is looking up all the same. The low consumption (merely 25 to 30 gm

per capita, against 4 kg in Europe) is due both to lack of promotional effort and restricted availability, largely in big cities only.

Most of the organised sector mushroom production units that have come up in the past decade are basically export-oriented. They have hardly paid any attention to building up a domestic retail market. Consequently, the high rate of growth in production of this edible fungi, witnessed in the 1970s and 1980s, could not be sustained in the current decade. The exports have, however, risen over eight folds in this decade. Virtual dumping of mushrooms in the major export markets by China, coupled with other problems, has put the Indian mushroom industry under some strain of late. While some units are struggling for survival, those in the pipeline are finding it difficult to secure adequate funding from the financial institutions,

An analysis of the SWOT factors (strengths, weaknesses, opportunities and threats), however, puts India in an advantageous position vis-a-vis its competitors, basically China. Besides the abundant availability of raw material (biodegradable agricultural residues) and cheap labour, factors like diverse climate, strong technical base and government support tilt the balance in favour of India.

Moreover, the present declining trend in the mushroom output in many other countries and fast growing demand in the traditional importing countries provide

tantalisising opportunities for the Indian mushroom producers. And, in case the domestic demand builds up - as it should considering the size of the population and the changing dietary habits - the future of the mushroom industry cannot but be bright.

But there are several formidable constraints that would have to be overcome to realise the available potential. One of the most significant among them is the historic mistake of concentrating the research and development attention on a single specie, the button mushroom, alone.

This has not only confined mushroom cultivation to naturally or artificially created cold environment but also restrained the capacity to meet the demand for other types of mushrooms, particularly specialty mushrooms that is growing much faster than that for button mushroom. Interestingly, most of these specialty mushrooms, such as oyster, shitake and wood-ear mushrooms, are relatively easy to grow and need lower investment than the button mushrooms. Some mushroom units suffered because they relied totally on the imported technology as well as machinery and tools without refining or adapting them to suit the local conditions.

Many of these aspects are now getting due attention of the scientists. The Solan-based National Research Centre for Mushrooms (MRCM), a part of the Indian Council of Agricultural Research, has oriented its research on the

development of indigenous equipment as well as on diversifying the species. In fact, it has opened up an exiting new field of cultivating medicinal mushrooms that should have immense commercial potential. Some other institutions and agricultural universities are also working on refining the mushroom production technology and fine-tuning it to suit the local conditions.

New and high-yielding strains of mushrooms are being evolved by the NRCM and other research centres. However, the Infrastructural problems faced in the post-harvest handling and marketing of mushrooms, especially the highly perishable fresh mushrooms, are yet to be tackled. And that is one area which the government, research organisations and the industry would have to take up jointly.

Business Standard 21-12-99



Food Processing

A country-wide network of cold storage would be set up for increasing the trade and export of fruits and vegetables. This was informed here by the Union Minister of State for Food and Processing. Mr. Syed Shahnawaz Hussain.

Mr. Hussain, who was here to participate in the inaugural ceremony of the Akhil Bharatiya Vidyarthi Parishad's 32nd state convention said that at present the trade was subject to un-necessary loss of 30 per cent because of

delayed transportation of fruits and vegetables from farms to the market.

He said that a team of his ministry would soon visit Betul and Harda districts of the State to explore possibilities of food and vegetable production and the establishment of related industries.

Central Chronicle, Bhopal 21-12-99



Snack Kings watch out or else

Haldirams, Lehar *bhujiyas* and other snack giants better watch out. There is tough competition awaiting them around the beginning of the new millennium - from the underworld.

Within a month, the Central Jail at Tihar (commonly known as Tihar Jail) aims to market in a big way *aloo bhujiya*, wafers, *chane ki daal* and even pure mustard oil prepared by undertrials and convicts.

And they have picked a trendy brand name too: "TJs" (short for Tihar Jail Special)

"It's a major step towards making the jail self-reliant," says director general prisons Ajay Agarwal. Jail officials are working on the marketing strategy, packaging and distribution.

Initially, the products will be sold at a shop near the Hari Nagar bus terminal. "Apart from other outlets, we will also contact schools like DPS and Modern to use our products in their canteens," said Agrawal.

Also, unlike the well-known brands which are using polythene to pack their products, TJs will go for environment - friendly recycled papers. "The inner layer could be aluminium foil," he said.

Special emphasis has been put on ensuring quality of the highest standard. The trial run has already been made in the jail canteens. Agrawal is already serving these snacks to his guests.

"Those in the kitchen have to go through a health check-up on a regular basis," he said. The doctors ensure they are not suffering from any disease and that their nails are always trimmed and clean.

A consultant from an NGO monitors the preparation and also guides them from time to time. "In fact, we already had a bakery set up by Kiran Bedi. The expertise is now being used for other specialities," he said. There are also a few inmates who have worked in bakeries and sweetmeat shops and their experience has been put to use.

While the collection will go to the jail relief fund, the inmates involved in the project are paid according to their skills. Effort is also on to include them in the marketing process.

The basic idea is to reform and rehabilitate. "Nobody gives them a job once it's known they were in Tihar; so many of them revert to crime. We want that when these people leave the jail, they should have the knowhow to set up a cottage industry on their own for a livelihood," said Agrawal.

Times of India

22-12-99



ISI mark will be mandatory for mineral water soon

The process of making ISI mark mandatory for production of natural mineral water has been finalised, according to sources in the Ministry of Consumer Affairs and Public Distribution.

A preliminary gazette notification has already been issued by the health ministry. This was done after receiving a proposal in this regard from the consumers affairs ministry.

A senior official said that though the need for ISI certification for mineral water was being felt in all fora, the changes in the Prevention of Food Adulteration Act could not be made as the matter was under consideration of the ministries of law and health.

The Act has been amended to ensure that no person could "manufacture or exhibit for sale of mineral water without ISI mark. A similar notification for bottled water was under consideration of law and health ministries", he said.

The notification for mineral water contains guidelines for description, type and for treatment and handling of natural mineral water. In order to eliminate the risk of contamination, hygienic requirements and standard of characteristics to be used in the production of mineral water have been specified.

Use of new statement or any pictorial device which could create confusion among the public about the nature, origin and composition and properties of mineral water sale have been prohibited.

Times of India

22-12-99



Seven Point Plan to boost Processed Food Exports

The Government has adopted a seven-point strategy to enhance processed food exports and tap the \$300 billion world market in the sector, Secretary Food Processing Industries, P S Bhatnagar said yesterday.

The government has delicensed the food processing sector besides declaring it as a priority area, Bhatnagar said.

He said foreign investments in the sector would be through automatic route and government had also allowed selling of 50 per cent stake in the 100 per cent export-oriented units.

Stating that lack of information was one of the causes for India losing available opportunities in the Food Processing Sector, he said there was a need to have a website to tap the potential available in the global market.

Bhatnagar was addressing a seminar on 'strategies for enhancing exports of agriculture and processed food products' organised by PhD Chamber of Commerce and Industry (PHD CCI).

Lack of appropriate technology,

total quality management and low investment in research and development are some of the primary reasons for the low share of processed food in India's total exports, he said, adding both the industry and the government should formulate an action plan to overcome the export inhibiting factors.

Business Standard 22-12-99



APEDA proposes Quality Marking for horticultural, packaged food exports

In an effort to establish India as a 'quality supplier' of horticultural produce and packaged foods in overseas markets, the Agricultural and Processed Foods Export Development Authority (APEDA) has proposed to introduce a barcoding system (BCS).

The system, which helps in tracing and tracking the origin of the product, is expected to kick off in the new year with the grape season. Reliable sources explain that currently India enjoys a good position in the European Union (EU) as far as grape exports are concerned. Recently, the EU has introduced a maximum permissible level for pesticide residue for imported commodities. Local exporters tend to procure produce from different farms, in which case it becomes difficult to trace the product's origin.

Further, in case of rejection of a particular container, it is the country's name which gets highlighted. Hence, in order to

track the origin of the produce supplier even at remote producing centres, APEDA has proposed this system. Officials said: "In a case when we track down the farmer who is using excessive pesticides, we would not punish him but suggest corrective measures in order to avoid recurrence."

The BCS will be done at the farm level, particularly at the pack house on the basis of weight, colour, size of the bunch, number of grapes in the bunch, pouch and various other parameters would be implemented while coding the produce.

Under the integrated programme, exporters today are supposed to test the pesticide residue from the designated laboratories. The test will be sponsored by APEDA to the extent of 50 per cent until the time the pesticide residue-free produce gets established in overseas markets.

Sources explain that the barcoding system is expected to have a dual effect. While on one hand it would impart a kind of training to the farmers, on the other hand it would force the exporters to check their containers for the acceptable levels of pesticides residue. The concept of BCS will enhance the quality of Indian produce in domestic as well as the export markets, experts feel.

Economic Times 22-12-99



Food Processing Industry must gear up for challenges

The Food Processing Industry

has a key role to play in stimulating economic development as 70 per cent of the population live in rural areas and depend on agriculture, the Minister of State for Food Processing, Mr. Shahanawaz Hussain, has said.

Speaking at the inauguration of the annual general meeting of the Federation of Biscuit Manufacturers on Wednesday, he said that this industry can also be used as an important instrument in improving food supplies through prevention of post harvest losses and generating large-scale employment.

The Minister said that the industry could harness the great potential it has for development of food processing by adopting appropriate strategies to face the challenge arising out of globalisation.

The fast changing socio-economic and demographic conditions in the country also require the development of technoeconomically sound food processing to bring good quality food within the reach of a large number of people, he added.

Business Line 23-12-99



Australian 'Berri' soon in State

Australia's number one fruit-juce brand 'Berri' will be launched in Karnataka and Goa next month.

The ready-to-use, fresh and unpolluted fruit juice, prepared from fruits picked from lush orchards of Australia will be brought to India by Great Linx Impex

limited (GLIL).

Addressing a press conference here, Managing Director of Unibrothers Impex Limited, the marketing company in India, Mr. Chandran Pothan, said that 'Berri has been an established fruit juice brand in Australia for more than 50 years. Berri fruit juice, which has already been launched in Kochi, Chennai and New Delhi, will be available in the packs of one and two litre PET bottles and one litre and 250 ml tetrapacks.

He said that Barri juices are "100 per cent pure and have no sugar, preservatives or other additives. Berri is a health drink, pasturised and sterile packed in modern high-tech plants in Australia for a longer shelf life - ten months. They are available in various flavours," he said.

Deccan Herald 23-12-99



Increase share in global Processed Foods Market: Raje

Government laboratories, small scale industries (SSIs) and consultants should work together to increase the country's share in the international processed foods market, Ms Vasundhara Raje, Minister of State for SSIs, has said.

Efforts were also needed to cater to the huge emerging market of processed foods in the country with rapid urbanisation and rise in per capita income, Ms Raje said inaugurating a two-day meeting on "opportunities in food processing

industry in the next millennium" here on Thursday.

A strong and effective food processing sector will facilitate diversification of agriculture too, she said. Around 80 per cent of the Food Processing Units are currently in the SSI sector and contribute about one-fifth of the total turnover of SSIs.

Rise in middle class population in the country would provide a major market for processed foods and attract investment to the tune of Rs. 1,60,000 crore in the next decade, Mr P S Bhatnagar, secretary, Department of Food Processing, said.

Development of Food Processing Industry would open up employment avenues in rural areas too, he said.

Food Processing Industry should attend to development of human resource and packaging technologies which were being neglected currently. "Many a time we loose business because of poor display of our products in market place, and neglecting human resource can be disastrous in this era of global competition," he said adding that Cumulative investment by financial institutions in the food industry sector had increased from about Rs. 6,500 crore in 1992-93 to Rs. 18,500 crore in 1997-98 - a 200 per cent rise.

However, the share of the food industry in the total sanctions by financial institutions had decreased from about 4 per cent to 2.5 per cent during the same period. Mr.

Bhatnagar said. Processed food industry in India faced the problem of procuring raw materials of required standards regularly which needed urgent attention, he said.

Steps were needed to improve consultancy capabilities in several areas in food processing to meet the emerging trends, he added.

Inefficiency at all stages - agricultural production, distribution and marketing - also add to the problem, Mr. Ashok parthasarathy, Chairman of Consultancy Development Centre (CDC), which is organising the meeting said.

The Observer

24-12-99



Entry strategy for US cos detailed

"India offers excellent opportunities in the Food Processing Sector. In 1998, sales of value-added food products totalled \$42 billions representing 30 per cent of total food market sales. The Indian Food Processing Industry is expected to grow by approximately 20 per cent per year over the next five years", a report recently published by the Office of Agricultural Affairs in the US Embassy has highlighted.

The size of the Indian Food market totalled approximately \$ 138 billions in the fiscal year 1998. Primary processing accounted for more than 70 per cent of the food processing industry. Consumers in the country spent about 73 per cent of total private

consumption (\$147 per capita) on food last year, the report said. By comparison, American consumers spent only 10.9 per cent of their disposable income (\$ 2605 per capita) on food in 1996.

Describing the structure of the Indian Food Processing Industry as highly fragmented, the report said there were 4.920 fruit and vegetable processing units, most with small capacities of less than one tonne per day.

Other major food processing activities included grain milling (rice, wheat flour, pulses), solvent extraction, sweetened and aerated water, sugar production, fish and meat processing as also production of dairy products.

The report said rise in household incomes, smaller households, urbanisation, women in workforce and preference for processed foods were the major factors driving growth in the food processing market in India.

Detailing an entry strategy essentially for American companies, the report said before selecting the best market entry route, the US food exporters should analyse the demand for their products in the Indian food processing industry and barriers to entry. Small US companies should select a trading company (possibly based in the US) which can support their marketing efforts in the Indian market.

For low and mid-value commodity food inputs, the US exporters should appoint

distributors for each major region of India. These agents would be able to market the US food ingredients to small food processors scattered throughout India, the report advocated.

The US exporters of high value-food ingredients and inputs may prefer to enter into agreements with the American food processors already established in India. In addition to their-own requirement, these American food processors can also market the food products of US exporters through their distribution network.

The US food processors might also consider the option of starting a joint venture for manufacturing processed foods, the report suggested.

The Indian Government allows 51 per cent foreign ownership in the food processing sector and many companies have received the Government approval for higher levels of foreign ownership.

Referring to prospects in the Indian market, the report said food commodities, vegetable oil, butter and margarine were products that were present in the market and yet demand for these was growing.

Products not present in significant quantities but which had good sales potential, according to the report, included cocoa products, groundnut oil, oilseeds, semi-processed food inputs such as preserved vegetables, frozen vegetables, thickeners, fruit juice concentrate, flavouring/colouring ingredients and soft drink concentrates.



Funding route for food units mooted

The Government is studying a proposal to initiate a special funding route for small scale projects in the food processing sector from financial institutions.

"Normally, banks and financial institutions do not appreciate the peculiarity of this sector and thus do not appraise projects adequately," said sources in the food processing Ministry.

The industry has called for a special scheme for financing of the projects particularly in the small and tiny sectors which normally face considerable pressure in procuring financial assistance.

"The very definition of the small sector industries needs to be amended in order to broaden it to small scale enterprises so that the distinction between the main industry, the associated service sector activities and other allied activities are also included," industry sources said.



New Govt. plans to double food output

The Agriculture Ministry has already made plans for doubling food production to 300 million tonnes in the next 10 years. The estimates are based on NDA's national agenda. Though foodgrains

have reached a record production of 203 million tonnes in 1998-99, there are little chances of doubling production in the near future given the constraint in expanding the net sown area. Ministry sources stated that doubling food production has become a necessity with people in urban areas and elite class preferring more of food items than cereals. They also feel that further change in diet pattern is also expected in the near future in many more parts of the country. Therefore efforts to double total food production should be taken up in right earnest to cope with the rising population which will cross the billion mark by 2007.

According to the official definition of 'food' it has come to include not only food grains like rice, wheat, coarse cereals and pulses but also crops like oilseeds, sugarcane whose extracts are used as food, fruits, vegetables, milk, eggs, meat and fish. The document prepared by the ministry stated that its 10 year prospective plan is in response to the warning given by the World Watch Institute that by year 2030 India may have to import over 45 million tonnes of foodgrains to balance food needs. The project figure of imports is four times more than highest import of 10 million tonnes in 1966. The estimated target of doubling food production will, therefore, take care of domestic needs and exports, feels government. The ministry also noted that despite the impressive growth in foodgrain production, the per capita net availability of foodgrains gives a dismal picture. In 1951 it was 144.1 kg in 1961

and in 1971 it was 171.1 kg and then it declined to 166 kg in 1981. In 1991 the per capita net availability of foodgrains however, rose to 186.2 kg but it declined to 175 kg in 1998.

Ministry has estimated that while the net sown area in the country is likely to remain unchanged at 142 million hectares, the gross cropped area can be increased to 203 million hectares in 2001-02 and to 213 million hectares in 2006-07 from the existing level of 191 million hectares. Similarly, the cropping intensity can be increased to 143 per cent. The gross irrigated area in the country can be increased to 89 million hectares in 2001-02 and to 106 million hectares in 2006-07 from the existing 76 million hectares.

Agriculture Today Dec. 1999



Centre to aid setting up of 5,000t cold storage Chain

The Union government proposes to provide 25 per cent amount as grant and 50 per cent as loan for setting up a chain of 5,000-tonne capacity cold storage facility by institutions.

This would form part of the new agricultural policy to be unveiled by the Centre soon, Union agriculture minister Nitish Kumar said while addressing the annual conference of All Maharashtra Pomegranate Produce Sangh at Sangola in Maharashtra yesterday.

Kumar said a National

Pomegranate Research Institute would be set up at Sangola.

He hailed the efforts of farmers of Sangola in promoting drip-irrigation in the area for cultivation of pomegranate.

Nationalist Congress Party president Sharad Pawar, who presided over the conference, said he had held discussions with the farmers in the area to start a new fruit-processing industry for fruits like pomegranate, pumpkin, mango, pineapple and guava at a central place between Tasgaon, Sangola, Malshiras, Indapur and Baramati talukas.

However, the farmers will have to raise a share-capital of Rs.3 crore for the venture, he said.

The state employment guarantee minister Ganapatrao Deshmukh said that of the 39,000 families in the taluka, 14,000 cultivated pomegranate and they should get good rates for their produce.

State horticulture minister Ajit Pawar asked the farmers to choose crops for cultivation in future after scrutinizing the strength of land and availability of water and emphasised the need for scientific farming.

Nitish Kumar also inaugurated a cold-storage built by Krishi Vikas Co-op Sanstha and released a souvenir.

Business Standard



Assocham seeks rescue package for Food Processing Industry

In view of the steady negative growth rates in the food processing industry and sharp decline in the growth of the kharif grain production the finance minister should announce a special bail-out package in the ensuing Budget.

The Associated Chambers of Commerce and Industry of India (Assocham), which has opposed bringing the agriculture sector in the income-tax net and advocated significant increase in land revenue in a statement, said that the growth in food grain production in the second half of 1990s indicates serious deficiencies.

While, the growth of rice production has declined by half, wheat has increased by more than 50 per cent and the production of food grains has grown at lower pace than that of the overall agriculture sector. But there has been a marginal increase in growth in the second half of the 1990s.

The difference in the growth of kharif and rabi grain output has further widened in the latter half of the nineties, according to the chamber. Therefore, the Budget should provide adequate incentives for reducing the dependence on monsoon and increasing irrigation of the khariff crops.

Assocham president Shekhar Bajaj said, considering various socio-cultural and economic factors, farmers have to be encouraged to adopt new technology. This needs agricultural extension and supportive institutional network

with clear understanding of agricultural technological parameters and constraints.

This calls for professionalisation of agricultural administration in the country. Corporate sector or NGOs involved in rural development, education or health projects can be effectively involved in such extension work and performance based specific incentives should be provided to them.

Subsidies on fertilizers, tractors, improved agricultural equipment, demonstrations, input kits, etc, may be regarded as investments by the government to encourage the farmers to adopt modern practices and may be confined in selective regions with better monitoring. The institutional support has to be provided in terms of strengthening the distribution channels for agricultural inputs including credit. There is a need to improve road and communication networks to cover all villages so as to improve information flow and speedy movements of goods.

Financial Express 6-1-2000



Image conscious : Hologram Manufacturers call for strict norms

The Hologram Manufacturers Association of India (HoMAI) has called for compulsory registration of holograms manufactured or imported into India. In this regard, the HoMAI has set up a Hologram Roster (HR) in the Capital recently which besides ensuring speedy

registration of holograms also guarantees security of images/holograms to its owners.

"It enables us to independently register holograms and ensure that copying of the images is not possible," says Arun Rastogi, Chairman, HoMAI. So far, 1,255 images have been registered with the HoMAI.

Interestingly, it's not mandatory to register a hologram with the government departments handling copyright issues. Those who register the images have to wait for six to nine months. In contrast, HoMAI claims, its HR, registers the image in 45 hours.

The association which held its general body meeting recently in the Capital has also called for recognition of the industry and greater use of holograms in the government sector. According to Dhillon, there's a tremendous opportunity for the government to recover revenue by using holograms in departments such as the Central Excise where there's maximum misuse of Modvat invoices, driving licenses, transport permits, examination certificates.

In Tamil Nadu, for instance, which has initiated the use of holograms in the Excise department, the recovery has been as much as 15-20 per cent (Rs. 150 crore) in a year while the total investment has been just Rs. 5 crore.

"Increasing incidents of country-made spurious liquor, synthetic milk and adulterated mustard oil are some recent

examples which could have been avoided with the usage of holograms," says U K Gupta, President, HoMAI. "Companies can register a 100 per cent return if they use holograms on their brands," adds Kapil Bajaj, Managing Director of Bajaj Holographics India, an HoMAI member. The association has also called for a stringent control and verification of imported holograms.

The association is planning to promote the use of holograms by increasing the awareness level of the user by holding seminars, participating in exhibitions; giving demonstration through a portable display unit; circulating introductory letters to various associations; and making presentations to various government departments.

Besides these, the body is also exploring possibilities of an export market for its members; and develop and upgrade members skills and understanding by exposing them to the professional update and educational programmes on technology in the hologram manufacturing and its constantly changing requirements; catalyse ISO 9000 certification of member companies.

An industry still in its infancy stage, it is currently posting a turnover of about Rs. 20 crore. Besides the private sector, the industry sees a lot of scope for the use of holograms in the government departments.

HoMAI is the only all-India association of carefully scrutinised and stringently chosen top manufacturers, suppliers of holographic machinery/raw material

and R&D centres. It also closely cooperates with international organisations pertaining to holographic science and technology and maintains close liaison with them.

Financial Express 10-1-2000



Kerala Kicks off Public Sector Cold Storage Chain

Kerala State Horticultural Products Development Corporation Ltd. (Hortcorp) has commissioned the first public sector cold storage facility in the state, kicking off its efforts to redefine vegetable retailing.

Hortcorp managing director VV Ramachandran told ET the 220-tonne cold storage facility commissioned in Munnar last week was the first in a series of such facilities that the corporation was planning.

Another cold storage with a capacity of 400 tonnes is planned to be commissioned at Eruthiampally, near Palakkad, during the current financial year and a 350-tonne cold storage unit is proposed to be set up at Wayanad next year.

Hortcorp, which has been a loss-making public sector enterprise in the past, earned a net profit of Rs. 1.4 lakh in the first six months of the current year on a turnover of Rs. 6.85 crore.

Munnar was chosen to locate Hortcorp's first cold store primarily because of the substantial amount of potato cultivation in the Vattavada and Kanthallur areas nearby.

Prior to Hortcorp setting up its Munnar cold storage plant, the only cold storing facility available in the state was the private sector Thasleej cold store in Palakkad.

Mr. Ramachandran said Hortcorp's effort to set up a cold chain was intended both as a boost for vegetable farmers in the state as also to benefit from the National Horticulture Board's (NHB) assistnace for setting up cold chains.

Hortcorp currently buys a shade lower than 50 per cent of its vegetable intake from neighbouring states, compared to a few years earlier when a majority of supplies came from outside the state.

Increased sourcing from Kerala has been made possible, thanks to the functioning of the farm co-operatives named Harita Sangams.

Hortcorp is currently procuring about 200 tonnes vegetables daily and is retailing it through 537 outlets in the state. The corporation plans to have 1,000 retail outlets during the current year.

Business Standard 14-1-2000



Govt. to allow 100% FDI in Food Processing

The Centre will allow 100 per cent foreign direct investment (FDI) in Food Processing through the automatic route, except in projects for non-molasses-based liquor. At present, automatic approval in this sector is allowed up to 51 per cent. All other projects are cleared on a case-by-case basis.

A senior government official confirmed that the government was considering 100 per cent automatic approval in this sector, but refused to give a time frame for its implementation. FDI through the automatic route in power projects is also allowed up to a maximum Rs. 1,500 crore. The Centre is also planning to frame a comprehensive draft policy for the food processing industry.

A nine-member committee formed under the chairmanship of P Murari to recommend policy changes in the food processing sector will submit its recommendations by the month end, according to an official. The new policy for the industry will focus on three areas—finance for production and marketing activities including export, development of infrastructural facilities for the sector, and more integration between farmers and processors. Based on its recommendations, the ministry of food processing industries will formulate a draft policy to face the challenges in the sector.

Business Standard 14-1-2000



Sikkim urged to set up ginger processing complex

A private sector company has asked the Sikkim government to set up a joint venture integrated ginger processing complex in the state for a fruitful utilisation of the huge production of ginger.

The managing director of Ardikem Management Services Pvt.Ltd., a Calcutta-based consultancy firm, Dipankar Ghosh told PTI that he has proposed to the government for the complex with an estimated cost of Rs. 8.5 crore.

The project to be a 100 per cent export oriented one, would help Sikkim earn foreign currencies by marketing different products of ginger extracts to foreign countries, Mr Ghosh who was here to discuss the scheme with the state authorities, said.

It was proposed that the state would have 49 per cent stake in the project, to be built under a turn-key consultancy basis. The rest would be held by a private entrepreneur.

Mr. Ghosh said Chief Minister Pawan Chamling who had met him in Calcutta last month and was impressed by the idea, invited him to Sikkim to have a thread-bare discussion with the officials.

Accordingly, a meeting with the chief secretary and other departmental heads was organised when the proposal was put up before the government.

"The government has assured us to communicate its decision by a fortnight," Mr. Ghosh said.

Mr. Ghosh, who is a partner of a German firm in India, said processed ginger can be utilised in preparing oil, candy, syrup, oleoresin (a chemical used in confectionaries).

"In international market, a kg of oleoresin costs over US \$400," Ghosh said.

The Observer



Garlic's Cardiovascular Benefits

In the May 26 issue of *Atherosclerosis*, researchers reported on the results of a four year clinical study which found that garlic helps prevent and in some cases, even reverse plaque build-up in the arteries. Arterial plaque is known

to be a risk factor for heart disease and stroke. The study, which took place in Berlin, Germany, is the longest ever to be conducted on heart attack risk reduction using a dietary supplement. Based on the 'heartening' results of this study and more than 20 others, researchers believe that powdered garlic may have both a preventative and a curative role to play in cardiovascular disease.

During the 48-month treatment period, 152 men and women were randomly assigned to take either 900mg of garlic powder or placebo each day. From the beginning, all participants had advanced plaque accumulation, in addition to at least one other established risk factor for heart disease, such as high blood pressure, high cholesterol, diabetes mellitus, or a history of smoking. Researchers used high-resolution ultrasound to measure the progression and regression of plaque volume in both the common carotid and femoral arteries.

At the end of the study, those who took garlic demonstrated a 2.6 percent reduction in plaque volume, compared to a 15.6 per cent increase in the placebo group. When the effects were analyzed by gender, the results for women initially took researchers by surprise. While women in the garlic group experienced a modest 4.6 percent decrease in plaque volume, those taking placebo demonstrated a massive 53.1 percent increase. Researchers attributed the striking difference to a higher rate of dropouts from the female garlic group, due to "annoyance by odor." This led to a predominance of younger women in the placebo group and more older women in the garlic group. Despite this unforeseen event, researchers maintained that the 4.6 percent

decline in plaque volume seen in the female garlic group remains a "genuine garlic effect."

Herb Res. News Vol.3 No.2



Production of Starch

The International Institute in Denmark has expertise in providing technology for plants for the production of starch from potatoes and casava/tapioca and downstream products like modified starch and sweeteners.

Interested parties may get in touch with Mr. Vinay Capila, Trade Counsellor, Royal Danish Embassy, 11, Aurangzeb Road, New Delhi-110 011. Tel:3010900, Fax:3792891 Telex 31-66160 AMDK N Telegr, adr, Ambadane.



CO₂ Analyser for Mushroom

M/s Edinburg Sensors, UK have developed CO₂ Analyser for Mushroom for Horticulture under the trade name "Guardian TM 3000" which helps in controlling the concentration of CO₂ in greenhouses, enhance the health and growth of plants, as well as the rate of ripening of fruit and vegetables. The Guardian TM 3000 is a high accuracy CO₂ meter to provide environmental control in the greenhouse and contributes critically to productivity by increasing the yield and quality of the crop.

For further details, you may get in touch with the Indian agent, Dr. S.K. Gupta, Managing Director, Analyser Instrument Co. Pvt. Ltd., 5-B-7, Vigyan Nagar, Kota-324005 Rajasthan. Tel:0744-410611, Fax:0744-423591

E-Mail satyendr@jpl.dot.net.in



"Opportunities in Indian Food Processing Industry in the Next Millennium"

An interaction "Meet" was organised by the Consultancy Development Centre CDC on 23-24 December 1999 at the India Habitat Centre, New Delhi wherein a number of topics concerning the prospects of the food processing industry in India were discussed. The lead for the "Meet" came from Mr. Ashok Parthasarthy Chairman of CDC and former Secretary, Ministry of Food Processing Industries. It was inaugurated by Smt. Vasundhara Raje Scindia, Hon'ble Minister for Small Scale Industries and Agro & Rural Industries (SSI & ARI) and Personnel. The key-note address was given by Shri P.S. Bhatnagar, Secretary, Ministry of Food Processing Industries. There were 4 technical sessions at which eminent consultants in the field of agri business and food scientists presented papers on various themes like Food Processing Industry in India and International Scenario, Global consultancy in the Food Processing Industry, Indegeniously developed technology in Food Processing, Changing trends in food technology, Raw materials for food processing, Management and finance, Export of Indian Food Products, Government regulatory mechanism and Economic incentives for development for the food processing industry in India were discussed. A number of consultants in the field of Food Processing and Policy makers participated in the "Meet". There was a panel discussion in the concluding session. The seminar was an important one and very appropriate to the time. The discussions were very useful.



Cooperation in Food Processing Sector between India & Kyrgyzstan

At the 2nd Session of Indo-Kyrgyzstan Joint Commission, various aspects of cooperation between the two countries on trade, scientific and technological areas were discussed.

Cooperation in Food Processing Sector

The two sides noted with satisfaction the positive outcome of the visit of the Minister of State for Food Processing, Government of India to Kyrgyzstan in August, 1997. The Kyrgyz side invited Indian companies to set up joint ventures for manufacture of baby food, fruit juices and packaging for food products in Kyrgyzstan. The Kyrgyz side also requested for Indian assistance for establishing modern food processing industries in Kyrgyzstan. The Indian side reiterated its invitation to the Minister of Agriculture and Water Resources of the Kyrgyz Republic and accompanying officials to visit India for a further exchange of views for cooperation in this important sector. The Indian side indicated that the National Dairy Development Board of India had the relevant experience and expertise in the dairy sector and the Kyrgyz side could consider working with the NDDB for this purpose. The Indian side also reiterated its invitation to the Kyrgyz side to visit a trade fair of food processing industries in India being held shortly. This would facilitate further discussions regarding cooperation in this sector. The Indian side also indicated that a business delegation from the Indian food processing industry was likely to visit Kyrgyzstan later this year.



INDUSTRY NEWS

Herbalife to set up Foods unit in India

Herbalife International is setting up a manufacturing facility for producing its range of nutritional food products and personal care cosmetics in the Indian market. Earlier, the company only had supply contracts with local manufacturers for producing these items.

The company will be setting up production facility by itself or in joint venture with other players for production of nutritional food products and cosmetics.

Herbalife has received permission from the Foreign Investment Promotion Board for setting up a manufacturing facility as long as it does not manufacture drugs based on herbs without permission of the FIPB or the Drug Controller.

The company has also been allowed by the board to trade and market nutritional food and personal care products as well as support manufacturing by its existing manufacturers and suppliers.

Earlier, the company was granted permission for only trading and marketing of nutritional food products and personal care cosmetics. The approved foreign equity in Herbalife was 100 per cent amounting to \$11.4 million.

Sources said the company decided to directly manufacture food products and cosmetics as the manufacturers with whom Herbalife had entered into supply contracts had limited production capacity and hence, were unable to manufacture products as per Herbalife's volume demands.

Moreover, sources said, producers identified by Herbalife were not in a position to improvise and enhance their manufacturing base or invest in specialised equipment and machinery required for the manufacturing of certain specialised products due to financial constraints.

It became necessary for the company to set up its own manufacturing facility as certain manufacturers identified by Herbalife were not in a position to comply with Herbalife's international quality standards.

The presence of large number of manufacturers was creating problems, for Herbalife had to co-ordinate between various manufacturers and to ensure strict global quality standards.

Economic Times 10-11-99



Foodworld likely to raise fresh Equity to Fund expansion

Foodworld, the supermarket retailing chain joint venture

between the RPG group and the Hong Kong-based Jardine group, will need to bring in about Rs.25 crore over the next three years, through the debt or equity route. Raghu Pillai, President, Foodworld, said, a decision will be made within 12-15 months.

Foodworld is a zero-debt company, having paid off its debts. It could gear itself to have a debt equity ratio of 0.5:1 but Mr. Pillai said it was more likely that the equity base would be expanded.

Now on an aggressive expansion path, Foodworld will require to increase its equity capital base from Rs. 51 crore now to Rs. 76 crore by March 2003 when it becomes a 100-store entity, Mr Pillai said. With 100 stores, it expects to have a turnover of Rs. 500 crore. Turnover for 1999-2000 is projected to be Rs.150 crore, up from Rs.84 crore in 1998-99.

The retailer, which now aspiring for regional status in the southern and western regions, has 32 stores in Pune, Chennai, Bangalore and Hyderabad. It will go national after it consolidated its hub-and-spoke rollout in the south and west.

Mr. Pillai said they would have 50 outlets by June 2000. To date, the retailer has invested a total of Rs. 50 crore, including Rs. 6 crore for property and plans to invest

another Rs. 110 crore, to take the number of its retail outlets to 100. "We will be profitable in our existing hubs by 2001," he said.

Foodworld has positioned itself as a neighbourhood convenience store and is in the process of tying up with farmers' groups for the supply of fresh fruit and vegetables. Mr. Pillai pointed to the huge inefficiencies, and margins, in the retail business now which provided scope for reduction for an organised player. With food and food related products comprising 85 per cent of all sales at such stores, these are critical issues, he said. "We will buy close to the source which will provide us margins and lower retail prices for the consumer," Mr. Pillai said.

Economic Times 2-12-99



Maharashtra Agro, Sciencetech may join hands to set up multi-fruit processing units

The state-run Maharashtra Agro Industries Development Corporation (MAIDC) and the Mumbai-based Sciencetech India will soon ink a joint venture for the setting up of multi fruit processing plants with a total investment of Rs. 106.55 crore in the Vidarbha region. These plants will be established at the orange rich Katol and Morshi.

State chief minister Vilasrao Deshmukh said that the Sciencetech India or the new companies to be floated by it will use Rs. 9.75 crore already spent by the government / Maidc at the

project sites as seed capital for this purpose and pay interest at the rate of 14 percent per annum. Sciencetech has also agreed to offer 30 percent of the paid up equity share capital by the respective companies to the orange growers at par and if the orange growers do not subscribe to this share capital, the former would be free to keep such share capital with it.

The grower farmers would be entitled to nominate their representative on the Board of Directors of respective companies in proportion to their group's shareholding in each company. Sciencetech has agreed that at least 10 percent of the fruits (raw material) required for both the plants would be purchased by the respective companies directly from the grower farmers.

State agriculture minister Ranjit Deshmukh told The Financial Express that except the amount of Rs. 9.75 crore already invested by the government/Maidc in land, building, plant and equipment, no further investment would be made by it. He recalled that the previous Shiv Sena-BJP government had proposed that the Maidc would pick up 40 percent equity while the 30 percent each by the Indian investor and foreign partner respectively. However, it has been changed now.

Agriculture minister said the amount needed to set up both these projects in excess of Rs. 9.75 crore would be raised by Sciencetech directly and/or through the new companies created

for implementation of these projects. He informed that after the company repays Rs.9.75 crore to the state government/Maidc (the repayment to start after five years from the date of transfer of assets to the new company, in five equal annual installments with interest thereon), the entire ownership of the company together with its assets will vest with Sciencetech.

Financial Express 6-12-99



Global Green gets Check Mate Certification

Global Green Company Ltd(GCCL), a Thapar group company engaged in the business of food processing, has been accorded highest quality certification for its products by Check Mate International Inspection Ltd of the UK.

The certification would enable GCCL to sell its products to all retail chains that accept British Retail Consortium (BRC) technical standards. This has opened new vistas of growth for the company in the UK, a company release said.

The production and packaging facility of GCCL at Whitefield (Bangalore) was inspected recently by Check Mate International, which carries out technical inspection of standards of food manufacturers and suppliers to the BRC, a chain of super markets across the UK.

GCCL reported a turnover of about Rs. 25 crores, including an export turnover of Rs. 24 crores for

the year ended June 30, 1999.

Business Line

8-12-99



Concept Foods to test-market 100% natural fruit bars in US market

The Hyderabad-based Concept Foods Pvt Ltd has developed 100 percent natural fruit bars-mango, mixed fruit and orange-for the US market. The company has tied-up with the US-based Preferred Brands to carry out consumer research and test market the product in the US for four to six weeks starting from January 2000, according to Concept Foods managing director TR Bhoopathy.

The company is also talking to a leading food-processing company in Germany to market its natural fruit bars in the whole of Europe. It is developing strawberry, cherry, lemon and orange fruit bars for the European markets.

The present product portfolio of the company includes Sunrays fruit bar in six flavours - mango, guava, pineapple, mixed fruit, black grape and tamango (tamarind and mango combination), apart from fruit pulps, dehydrated potato cubes, flavoured candies and digestive lozenges.

The company currently exports the Sunrays fruit bars and mango pulp to the US, Saudi Arabia, Dubai, Kuwait, Bangladesh and Nepal. It exports about 15 to 20 percent of its total output.

The company is perhaps the

first to introduce cereal bars in the country and brand 'mamiditandra' (dehydrated layered mango pulp) - Mango Delite. It is looking at getting at least 10 percent of the Rs. 100-crore unorganised aam papad market by March 2001. The company's policy is to find generic products like aam papad and brand them, said Bhoopathy. It is also planning to export the cereal bars and Mango Delite, he said.

The company is planning to treble its pulp processing capacity to 75 tonnes of the finished fruit bar per month to meet the increasing domestic and overseas demand. However, the long-term strategy of the company is to increasingly outsource the manufacturing of its products and concentrate on marketing and leverage on its nationwide distribution network, said Bhoopathy. The company has 600 distributors across the country and hopes to take the figure to 1000 by March 2000.

The company is already outsourcing the manufacturing of its throat lozenges and herbal candies - Turmint and Hatrick - from the Hyderabad-based leading confectioner 'Sampre Nutritions'. It has also tied up with the Nagpur-based Indian Foods and Fermentations Ltd for the manufacturing of dehydrated potato cubes, flakes and powders under the brandname 'Cutos'.

The market research for this product, conducted by the UK-based market research agency, MBL,

will be completed by end 1999. It will be initially test-marketed in Mumbai, Hyderabad and Pune and go national by June 2000.

The company is evaluating the possibility of outsourcing the manufacture of coconut dessert and dessicated coconut from the Hyderabad-based integrated coconut processing company Regent Agro Products Ltd. Regent Agro has already tied up with Dabur for two of its other products including the 'CocoChef' - coconut milk.

Financial Express

8-12-99



An ethnic drink

Miracle Food Processors International Limited, a joint venture with Winter umwelttechnik GmbH, is making a concentrate of an ethnic drink - coconut water - using the latest spray evaporation technique.

The process has enhanced the shelf life of the coconut water concentrate to one year, while effectively reducing the cost of a glass of coconut water to Rs. 3.

Managing director P P Ahamed Kutty said that patent applications were filed for processing this product as well as the coconut jam. While there has been a good response for these products overseas, Kutty is awaiting funds to set up a domestic distributor network.

The products going under the brand name of 'Zat' are available in a small way in Kerala, Mumbai, Delhi and now in Chennai. The company also offers pineapple

concentrate, mango milk shake and grape drinks.

Financial Express

8-12-99



Ready-to-eat dessert

Regent Agro Products Limited, which has set up India's first integrated coconut processing plant in technical collaboration with Alfa Laval/Tetra Pak, Sweden and Singapore has innovated with a ready to eat coconut dessert in strawberry and mango flavours, costing Rs. 18 per pack. Located in Rajahmundry in Andhra Pradesh, Regent Agro is onto integrated coconut processing, post harvesting of fruits, manufacturing coconut shell powder, coir pith etc.

Managing director N Prasad Satyendra said that his company was the first in the country to manufacture coconut oil from fresh coconut milk while others do so from copra. This method brings out a sparkling pure product with a longer shelf life and has been recommended by many skin doctors. The company processes 15,000 coconuts a day and sells its products under the brand names of Coco D'Lite, Coco Chef, Coco Sip etc. Both companies have a turnover of Rs. 6 crore and expect a 50 percent growth in the market.

Financial Express

8-12-99



Kelloggs India test-marketing new cereal bar

Kelloggs India Ltd. the 100

percent subsidiary of Kellogg Co of the US. is test-marketing a new cereal bar in Bangalore. It is to be marketed as a convenience food in marshmallow and chocolate flavour.

The company is test-marketing the product in some 4,000 retail outlets in Bangalore and expects to complete the evaluation of market perception in six months, company managing director K. Venkatachalam said speaking to The Financial Express.

According to him a range of breakfast cereal of cornflakes and basic cereals of wheat flavour, a high value product like muselix, children's cereals like frosties and chocos have been well received by the market. Last year the company launched a range of biscuits under the brand Komplete which is fortified with vitamin and minerals, the first time such a range has been launched in the country.

The company is spending Rs. 1.5 crore for national advertising and promotion of the cereal bar. A similar amount was spent for launch of its children's cereal chocos in 1998 and brand of biscuits early this year. Breakfast cereals are available in 55,000 retail outlets and biscuits in 125,000 retail shops throughout the country, he said.

Venkatachalam said breakfast cereals have shown a growth of over 60 percent in volumes and over 80 percent in value share in the market which is estimated to be around Rs. 70-75 crore in the country. He said the breakfast cereals have grown 8 to 10 times

since launch in Mumbai in September 1994 and the national launch since September 1995. According to an ORG report, the total market for breakfast cereals is about 4,000 tonnes per annum.

The challenge for the company, he said, is to build a new category of breakfast cereals and other products as green-based nutritious food and becoming a lead player.

The proposition before the company is to have a low-calorie low-fat breakfast food, a food that meets 25 percent of daily requirements of vitamins and minerals. Also to follow nutritionists statement that breakfast is an important food and making people use recommended diet. This year the company expects to cross a sales turnover of Rs.75 crore. Last year the sales turnover was Rs. 50 crore.

Financial Express

9-12-99



Mega Foods plans to open catering unit in S Africa

Mega Foods Products and Caterers Madras (P) Ltd is planning to open a catering and manufacturing unit in South Africa by March 2000. The company is planning to cash in on the huge population of Indians and those of Indian origin in South Africa.

The company specialises in pre-cooked concentrated food which has to be added to hot water, rice or vegetables before serving.

Their products include five varieties of rice tomato, tamarind,

lemon, vegetable *biryani* and fried rice, vegetable gravies for chole, dum aloo and curry, masalas for sambar, bisebele bhath and panipuri and four varieties of rasams - lemon, tomato, garlic and spicy. The company also makes jams and sauces.

All the products of the company are priced between Rs.12 and Rs. 15 for a 50gm pouch, which is enough for three to four servings. The company sources its specially developed multilayered aluminium-based pre-cast aroma and moisture preserving packaging from Ahmedabad-based Shrirama Multitech Ltd.

According to Mega Foods managing director Amit Vaishnav, the company will soon introduce ready-to-eat products like parsi dhansak. Punjabi black dal and Gujarati mixed dal.

To distribute these products, the company is looking for distributors and stockists within the country and outside.

It is planning to sign a memorandum of understanding with a US-based distributor of Indian foods-Taj Foods and Qatar-based distributor to distribute its products in the US and West Asia respectively.

Currently, its products are mainly sold in supermarkets like the Foodworld and Vitan Chennai. Smaller retailers are averse to experiment selling new products, says Vaishnav.

Financial Express 8-12-99



Sri Lankan orders for food processing systems

A 40-member delegation from Sri Lanka, which visited the Foodpro '99 exhibition in the city, has placed orders for food processing, packaging and printing equipment and systems. The delegation members also finalised arrangements with participants in the exhibition for importing Indian food products.

Another delegation of 37 members from the North Eastern States, comprising senior officials from their Agriculture and Horticulture Departments and Agri Development Boards has also visited the exhibition, says a press release from the Confederation of Indian Industry-Southern Region (CII-SR), organisers of Foodpro '99 international exhibition and conference.

A 25-member multi-country delegation of participants from Myanmar, Ghana, Syria, Nigeria, Vietnam, Zambia, Iraq and the Philippines also visited the exhibition.

Foodpro '99, which is to conclude tomorrow, has so far attracted 18,000 business visitors, the release adds.

The Hindu 9-12-99



Parle Agro plans to hike capacity

Parle Agro Ltd, manufacturers of the popular flavoured drink 'Frooti', will invest Rs. 25 crores to double the manufacturing capacity of its Patalganaga plant in

Maharashtra to 5.4 million cases, a top company official said.

"We plan to raise the capacity of the Patalganga plant to 5.4 million cases next year to retain our market share of about 75-80 percent," the Chairman. Mr. Prakash Chauhan, said.

The Patalganga plant currently manufactures about 2.5 million cases (of 27 packets) of Frooti and the capacity expansion would be completed by May 2000, he said

While setting up own manufacturing capacities in the domestic market, Parle Agro had adopted a strategy of granting franchisee rights in overseas market, Mr. Chauhan told PTI.

Parle Agro, which also manufactures the 'Parley Bailley' mineral water, would also set up a fresh bottling plant in the National Capital Region, he said.

The mineral water bottling plant, with an annual capacity of around two million cases, would be completed at an estimated cost of Rs.10 crores, he said, adding the objective of putting up a fresh facility in the North was to gain a "sizeable" market share. Mr. Chauhan claimed that Parle Bailley enjoyed an all India marketshare of 24 percent, majority of the sales being accounted by western and southern States, Parle, which exports Frooti to over 29 countries and has granted franchisee rights in countries such as Nepal, Bhutan and the US. will enter soon into similar agreements in Sri Lanka and Singapore, Mr. Chauhan said.

The company, which clocked a turnover of Rs. 320 crores in 1998, was looking at a higher turnover of about Rs. 400 crores this year, he said.

"Parle Agro will grow in the Indian market by leveraging on the huge potential for fruit drinks in the home segment and through introduction of more natural fruit juice," the company's General Manager, Mr. B.L. Venkateshwar, said. He said the entry of a number of new players such as Tropicana, Dabur and Godrej, had not dented Frooti's marketshare as it had the advantage of huge marketing network.

"Besides taking advantage of our marketing network, we would also be considerably enhancing the budget on advertisement this year," he said.

Mr. Venkateshwar said the entry of Parle Bailey in the north Indian market was unlikely to pose any challenge to Bisleri, a mineral water brand owned by Mr. Ramesh Chauhan. Mr. Prakash's brother.

"The market is big enough to accommodate each player and we believe in mutual existence," he said. With the completion of new bottling facility in the North, the share of mineral water in the company's revenue was expected to cross Rs. 100 crores, he added.

Business Line 13-12-99



Potatoes and coconut concept foods to be Launched under 'Cutos'

Hyderabad-based Concept Foods Pvt. Ltd. is aggressively eyeing the convenience foods industry. The company plans to emerge as a major player with the launch of its ready-to-cook and ready-to-serve range of products in the year 2000. The company is also investing heavily in brand building: from the current Rs.40 lakh, Concepts is hiking its ad budget to Rs.1.5 crore. for next year.

The company is currently conducting market research for a slew of new concept based on two products: potatoes and coconut. While potatoes will be made available as dehydrated potatoes in the form of flakes, powder and cubes, coconut will be sold in the form of desiccated coconut, coconut deserts, coconut milk and coconut milk powder. To be launched under the brand name 'Cutos', these will be test marketed in January 2000, and rolled out nationally in April 2000. Targeted at the higher middle income group, with a premium positioning, Concepts' convenience foods will be sold through large retail outlets.

A relatively young player in the food industry-the company was incorporated in September 1997-Concept has expanded its product portfolio from a range of fruitbars-sold under the flagship brand Sunrays-to confectionery; health fortifiers; and convenience foods. According to S Sundara Rajan, general manager (sales), Concept Foods: "We feel we are with the right product at the right time in the industry."

The food processing industry

is worth Rs.40,000 crore and the convenience foods segment itself is estimated to be worth Rs. 5,000 crore in the next 10 years. Concept has just introduced the country's first cereal bar branded E2 and positioned as the 'the double energy bar'. The product - launched in Delhi and Andhra Pradesh so far - is a ready-to-eat bar made out of rice crisps, wheat flakes and rolled oats. Available in two variants, peanuts and mixed fruit. It is being sold in two sizes: 45gms at Rs. 10 and 10gms at Rs. 3.

The company recently entered the hard-boiled sugar confectionery category with the launch of Hatrick, a digestive candy, priced at 50 paise. Its other brand in the segment is Turmint, a cough candy with turmeric, priced at 50 paise. Concept is also looking at opportunities by converting mass unorganised sectors into branded products. For instance, It has made a beginning by branding the traditional aampapad as Mango D'lite, available in a consumer pack of 75gms priced at Rs.10.

Concept's products are present in 15 states and the company plans to reach out to other states before the end of the financial year. It currently claims to have 600 stockists and plans to take the number up to 1,000 by the end of next year. By the end of year 2000. It plans to strengthen its retail reach from 75,000 to two lakh outlets.

Financial Express 22-12-99



Fixing the recipe for foreigners

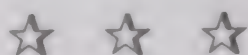
While establishing itself in the domestic Indian market with a wide range of products. Concepts Foods Pvt. Ltd is entering the global market place, too. While so far it was targeting the ethnic, NRI audience in countries such as Nepal, Bangladesh, Kuwait, Middle East and the US. It is now eyeing the local audience as well.

For this, it has adopted a two pronged strategy: one the product formulation of its fruit bars sold under the flagship brand Sunrays is being changed to '100 percent natural' content following the European penchant for 'natural' products. Two, the company has recently tied up with the US-based Preferred Brands (the company also markets the Pune-based ready-to-eat brand Tasty Bite) to market its products. The products will be formally launched in the US and Europe in October 2000.

Concept is also considering import of some products like sauces, and other health based products from South Asian countries.

The company which posted a turnover of Rs. 2.5 crore in the year 1998-99 (of which exports are Rs. 40 lakh) expects to achieve a turnover of Rs.6 crore (with exports of Rs.1crore) by the end of the current financial year. The company hopes to break even by the end of year 2000. In the next five years-by 2005- Concept aims to be a Rs. 100 crore company.

Financial Express 22-12-99



Dabur arm to sell cookies, syrups in Spirulina range

Dabur subsidiary Sanat Products Ltd, manufacturers of ayurveda and herbal products under the Sunova brand name, is planning a line extension for its largest-selling Spirulina range into syrups, cookies and candies.

It is also planning to launch a Vitamin C tablet around the Spirulina product, Sanat Products managing director B Dasgupta told ET. Spirulina is one of the richest health foods in the world, referred to as the 'greatest super food' by several international bodies. It is also used by NASA scientists during space missions.

"We are looking at ways to market the 'greatest super food' with various segments, right from infants to young adults. Our research and development department is currently giving final touches to the product," Mr. Dasguptas said. Developing Spirulina in other segments would be an important part of the company's strategy, he added.

At present Spirulina, which is derived from algae at the company's facility in Tamil Nadu, is only available in the form of tablets and capsules. "Supplementing nutrition is our forte and this becomes more important now with the high stress levels, pollution and low-nutrition food that is characteristic of city life," Mr. Dasgupta said.

Sanat has also signed up with Hyderabad-based National Institute of Nutrition to conduct a bio-

availability study on pregnant women to study cases of low birth weight and how Spirulina could be utilised for correcting it, he said. The company is also in the process of re-designing its website for propagating its products on the net. "We are also planning to get into e-commerce subsequently," he added.

Sanat also plans to popularise some of the herbs found in India and take it to the global market. The company, which maintains an export and domestic sales ratio of 50:50, expects to register a turnover of Rs. 10 crore from exports this year.

"We will launch three to four new products every year," Mr Dasgupta said. Apart from the recently-launched gel for arthritis (Nopane gel), it also produces Rejuva, a stress and vitality capsule, and Bioslim, a slimming capsule. It is also looking at launching products to cure diabetes, hair fall and HIV infections.

Economic Times 23-12-99



Global Green buys VST unit for Rs 20 cr

The Global Green Company, a Thapar group-promoted firm, has bought VST Natural Products for Rs 20 crore. VST Natural Products is a wholly owned subsidiary of the Hyderabad-based cigarette manufacturer VST Industries.

The deal, brokered by Mumbai-based merchant banker Rabo Bank, was concluded yesterday.

VST had earlier announced that it was in negotiations with Global Green but had declined to reveal details of the consideration. "Until the sale has been brought to full closure, both the parties felt it would not be desirable to disclose the terms owing to certain sensitivities involved," the company has said in a statement. VST has finally sewn up the sale and is expected to announce it today.

VST Natural Products is mainly into manufacturing and marketing of bottled products such as pickles, vegetables and spices. The sale is part of the restructuring programme. The intention is to focus on manufacture and sale of cigarettes, which is the company's core competency.

The proceeds from the sale are to be partially deployed in retiring debt.

Business Standard

24-12-99



Dabur seeks an overseas ally for Food Subsidiary

Dabur India is looking for a strategic partner who will take a minority stake in its wholly-owned subsidiary Dabur Foods. The company is considering an equity alliance with a foreign partner, with the objective of introducing new products and technology in Dabur Foods.

"We are looking for a foreign strategic partner who will pick up a minority stake in Dabur Foods. The foods business is growing at a fast rate but we feel that a foreign partner, who will bring in new technology and products will further accelerate the pace of growth," VC Burman, chairman, Dabur India, told ET.

Refuting reports about Dabur Foods wanting to sell the 'Real' brand VC Burman said the company was looking at the possibility of acquiring juice brands.



"There is no plan to sell Real and we are looking at a complete range of juices," he said. "McKinsey has identified foods as one of the pillars of our business. In fact, one of the family members, Amit Burman, is heading the foods business."

VC Burman said Dabur India was looking for a strategic partner not for fund infusion but because a foreign partnership will give Dabur Foods access to new technology and products. While food MNCs are unlikely to be interested in taking a minority stake, Mr Burman said there were medium-sized companies which may show interest. Dabur Foods CEO Amit Burman said the company is also looking at other ties for technology and expertise.

Economic Times

6-1-2000



APEDA NEWS

COMPARATIVE PERFORMANCE FOR EXPORT APR- 'SEPT 1999 Vis-A-Vis PREVIOUS YEAR

PRODUCTS	QTY In MTs	APRIL-SEPT - 1998 VALUE Rs.Lakhs	AV-Value	APRIL-SEPT1999 QTY in MTs	VALUE Rs.Lakhs	AV-Value	%Change Rs/Kg.	%Change Rs.	Change in US\$ A.V.Real	Targets1999 Rs.Lakhs	Targets1999-2000 US\$ Mill.
SCHEDULE PRODUCTS											
FLORICULTURE & SEEDS											
A FLORICULTURE		8873.19	22.46		9157.91	21.55	3.21	-4.08		13800.00	16800.00
B FRUIT-VEG SEEDS	1615824.00	5076.97	12.85		4347.38	10.23	-14.37	-20.42		8000.00	10600.00
		3796.22	9.61	2844447.00	4810.53	11.32	26.72	17.77		5800.00	6200.00
FRUIT & VEGETABLES											
		27798.74	70.38		28957.36	68.13	4.17	-3.19		52500.00	54000.00
A.FRESH FREUITS		10596.14	26.83		12421.14	29.23	17.22	8.95		27500.00	27500.00
B FRESH VEGETABLES		17202.60	2004.58		16536.22	38.91	-3.87	-98.06		25000.00	26500.00
PROC FRUITS & VEGETABLE		36644.62	92.77		56415.96	132.74	53.95	43.09		64000.00	69000.00
A PULSES	62335	12860.35	32.56	20.63	20728.71	48.77	21.40	49.81	3.73	27000.00	23000.00
B PROC FRUITS & JUICES		15455.67	39.13		25833.80	60.79	67.15	55.35		25000.00	30000.00
C PROCESSED VEGETABLES		8328.60	21.09		9853.45	23.18	18.31	9.96		12000.00	16000.00
LIVESTOCK PRODUCTS											
		41013.15	103.83		38950.20	31.65	-5.03	-11.73		95500.00	84500.00
A POULTRY & DAIRY PRODUCTS		3891.09	9.85		3508.41	8.26	-9.83	-16.20		7500.00	10000.00
B MEAT AND ITS PRODUCTS		37122.06	93.98		35441.79	83.39	-4.53	-11.27		88000.00	74500.00
OTHER PROCESSED FOODS		62990.05	159.47		56612.25	133.21	-10.13	-16.47		116000.00	117000.00
A GROUNDNUTS	21232	5128.43	12.98	24.15	8293.20	19.51	26.28	50.30	8.81	20000.00	13000.00
B GUARGUM	56627	42417.28	107.39	74.91	31599.29	74.35	-25.50	-30.76	1.28	60000.00	70000.00
C SPIRIT AND BEVERAGES		3057.68	7.74		3360.39	8.61	19.71	11.26		6000.00	7000.00
D MISC PROCESSED ITEMS		12386.66	31.36		13059.37	30.73	5.43	-2.01		30000.00	27000.00
NON-BASMATI RICE	1730240.00	171575.58	434.37	9.92	571829.00	61438.72	10.74	-64.19	-66.72	240000.00	430000.00
SUB-TOTAL	17302400.00	348895.33	883.28		571829.00	251532.40	-27.91	-33.00		581800.00	771300.00
NON SCHEDULE PRODUCTS											
A.BASMATI RICE	307587.00	93977.02	237.92	30.55	252737.00	80798.84	190.11	-14.02	-20.09	177800.00	185000.00
B.WHEAT	1758.00	134.84		20.00	1.73					273.85	
C.OTH CEREALS	2525.00	206.54	0.52	8.18	2481.00	220.86	0.52	6.93	-0.61	6500.00	1100.00
SUB-TOTAL	311870.00	94318.4	238.78		255238.00	81021.43	190.64	-14.10	-20.16	184300	186373.85
TOTAL	2042110.00	443213.73	1122.06		827067.00	332553.83	782.48	-24.97	-30.26	766100.00	957673.85

• SOURCE : FIGURES BASED ON DGCIS SEPT'99 MONTHLY VOL.
1998-99 : US\$=Rs.39.52
1999-2000 : US\$=Rs.42.50

GOVT. CIRCULAR

Ministry of Health and Family Welfare

(Department of Health)

NOTIFICATION

New Delhi the 10th December 1999

G. S. R. 809(E).-The following draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955 which the Central Government, after consultation with the Central Committee for Food Standards, propose to make, in exercise of the powers conferred by subsection (1) of Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), is hereby published as required by the said sub-section for the information of all persons likely to be affected thereby; and notice is hereby given that the said draft rules will be taken into consideration on or after the expiry of a period of sixty days from the date on which the copies of the Gazette of India in which this notification is published, are made available to the public;

Objections or suggestions, if any, may be addressed to the Secretary, Ministry of Health and Family Welfare, Government of India, Nirman Bhawan, New Delhi.

The objections or suggestions which may be received from any person with respect to the said draft rules before the expiry of the period so specified will be considered by the Central Government.

DRAFT RULES

1. (1) These rules may be called the Prevention of Food Adulteration (.....Amendment) Rules, 1999.
- (2) These shall come into force after one year from the date of their publication in the official gazette.
2. In the Prevention of Food Adulteration Rules, 1955, in rule 32,
 - (i) for clause (c), the following shall be substituted, namely:-
 - (c)(i) The name and complete address of, and the location of the manufacturing unit, and in case the manufacturer is not the packer, the name and address of the manufacturing unit and the packing unit.
 - (ii) Where an article of food is manufactured or packed by any person or a company under a written authority of some other manufacturer under its brand name, the label shall carry the name and complete address of, and the location of the manufacturing/packing unit and the packer, as the case may be, and also of the manufacturer or company for whom and on whose behalf it is manufactured or packed.
 - (iii) Where any article of food is imported into India, the package of food shall also carry the name and complete address of the importer in India:

Provided that where any food article manufactured outside India is packed in India, the package containing the said food article shall also contain on the label the name of the country of origin of the food article and name and complete address of the importer and the premises of the packing in India.

- (ii) Explanation - II shall be omitted.

[F.No..P.15014/4/99-PH(Food)/DMS&PFA]

DEEPAK GUPTA , Jt. Secy.

Foot Note : The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide S.R.O. 2105 dated 12-9-1955 and were last amended vide G.S.R No. 694 (E) dated 11-10-99.

PRESS NOTE

Government has issued three final notifications viz. GSR No. 692(E) dated 11-X-99, GSR No. 694(E) dated 11-X-99 and GSR No. 695(E) dated 11-X-99 amending the provisions in the PFA Rules 1955, in respect of a range of issues. These amendments include fixing the standards for white pepper, (whole and powdered), prescribing the sale of powdered condiments, only in packaged form, banning the use of colour in pickles, reviewing the list of permissible flavours in tea, specifying the limit of Doxynivalenol (DON), a mycotoxin in food grains and prohibiting the reuse of plastic containers for packing edible oils. All the above amendments, except the limit fixed for DON, comes into effect 6 months from the date of their publication in the Gazette to give adequate time to the Industry to gear itself to meet the new requirements. The specification for DON comes into effect from the date of publication of the Notification.

2. At present there are no specifications for white pepper. However it was felt necessary to specify them since this spice in whole or powdered form is expensive and there were reports of adulteration.

3. Similarly, although it is already stipulated that all spices should only be sold in a packed form, it has been decided to specify this requirement separately for condiments like chillies, turmeric, coriander etc. for purposes of greater clarity in implementation and to distinguish them from powdered spices like cardamom, cinnamon, pepper etc.

4. Use of colour in pickles has been a long accepted practice in the country. However it has been decided to ban this practice henceforth to allow consumer a better assessment of the quality of the product, since colour can mask both the quality and appearance of the pickle and mislead the consumer.

5. The existing list of flavours permitted for flavouring tea has been reviewed to allow all natural and natural flavouring substances. In all these cases, the common name of the flavour used will need to be mandatorily mentioned on the label of the product for the information of the consumer. All manufacturers of flavoured tea will also have to register themselves with the Tea Board and indicate this Registration number on the label.

6. Govt. have also laid down for the first time the maximum limit for Doxynivalenol (DON), a mycotoxin found in food grains, especially in wheat grown in cold climate. This had not been specified earlier because this mycotoxin is not normally found in wheat grown in the country. However it has become necessary to do so because it may be present in wheat imported into the country.

7. Reuse of plastic cans for packing edible oils and fats will henceforth be prohibited. This decision has been taken in consumer interest because cans used for packaging products like insecticides, petroleum products, mineral oil, paints etc. were being reused for packaging a food product like edible oil, thus contaminating a product of mass consumption.

8. All the above proposals are based on technical recommendations made by the Central Committee for Food Standards (CCFS), a statutory body that advises Govt. on technical matters and have been finalised after examining the suggestions and comments received from the public after the draft amendments were notified in the gazette previously.



NEW PRODUCTS

Quick cook Potato Processing

Description : The Australian company, has developed new technologies for the manufacture of specially dehydrated potatoes to produce a range of new products including fat-free potato crisps, quick chips and pronto potatoes. This technology enables the production of fat-free potato crisps with either no added fat or as little added fat as one desires. From the same technology, the manufacturer can produce Quick Chips, which are shelf-stable and can be made into crisps in only seconds by immersion in hot oil, and the Pronto Potato range which delivers convenience, variety and natural potato flavour and texture to many Potato dishes with applications for cup potatoes, toaster potatoes, hash browns and potato pancakes. The traditional process of frying fresh potatoes to manufacture crisps is inefficient, seasonally reliant, wasteful and results in 40% fat content, a major health concern. This technology produces healthy, lowfat snack foods in line with nutritional needs and consumer demand. The company has more than 50 years of experience and success in the Australian food industry and has developed more than 25 different core food technologies in convenience grains, legumes, vegetables, potato

products, herbs, fruits, meats soybean products, breakfast cereals and syrup food products. The company holds worldwide patents for its food technologies and has over 30 licensees around the world. **TRANSFER FORMS :** Technology Licensing.



Non-Freeze Fruit

Description : The company has invented a new technology to preserve fresh fruits so they remain soft and unfrozen at freezer temperatures and keep the desired attributes of fresh fruit. The fruits retain their fresh flavours, vitamins and colours, as well as the cell structure - usually degraded by freezing - to maintain their fresh fruit texture. They are 100% fruit, free from additives. This new process involves the partial dehydration of the fruits before storing then in a freezer. Non-Freeze fruit has applications in the ice-cream, baking, beverage, yoghurt, desserts, bars and confectionery industries. This new technology now offers significant cost-savings all along the manufacturing, transport and marketing chain, with added product safety and much improved quality. The company has more than 50 years of experience and success

in the Australian food industry and has developed more than 25 different core food technologies in convenience grains, legumes, vegetables, potato products, herbs, fruits, meats, soybean products, breakfast cereals and syrup food products. The company holds world wide patents for its food technologies and has over 30 licensees around the world. **TRANSFER FORMS :** Technology Licensing.



Pre-Gelatinized flour Technology and baby food base system

Description : Pregelatinized flour technology as been developed through significant advancement in the application of extrusion technology. The final product is similar to product produced by Roller drying process, while virtually eliminating all the problems associated with roller drying process. The manufacturing process is as follows : The raw materials are fed into the mixer and then cooked in the gelatinizing screw in the presence of water. The heating system is technologically advanced to ensure the temperature variation are minimum and the product is gelatinized to the required specifications. The product is then

cut and dried in a special drier to ensure drying is adequate to achieve best water absorption capability. The dried material is cooled and then ground in milling unit to required size. **Advantages** : Roller drying process conversion cost is almost four times higher than in case of this technology. The manpower requirement and maintenance of the equipment being offered is very low. **Production capacity** : 100 kg/hour (Plants upto 700 kg/hour capacity available) **Stage of Development** : Commercialised in India **Economic Data** : Machinery/ equipment - Rs.

90,00,00 **Transfer Forms** : Turnkey, Production equipment.



Egg Powder

Description : Russian agency is offering know-how and equipment to manufacture egg powder. The know-how is connected with separate constructive elements of the drying plant and the equipment includes machine for breaking eggs, melange filter, tank with a pump, and drying plant. To install the equipment premises with square equal to 144 sq. meters, gas/steam

connection and a 100 kW electric engine are required. The time of continuous functioning of equipment is 22 hrs/day. Two hours are required to wash through the equipment. Personnel required: two people. The equipment will serve 12 to 15 years of time. **Areas of Application** : Food industry. **Advantages** : Environment friendly technology Growing market, Automatic plant with operational convenience. **Economic Data** : Equipment Price Rs. 54,00.00. **Transfer Forms** : Technology, Equipment, Consultancy.



GOPI INDUSTRIES

Manufacturers: Dehydrated Fruits & Vegetables

ONION, GARLIC, POTATO, CARROT, CAULIFLOWER,
CABBAGE, SPINACH, CORIANDER, TOMATO, TAMARIND,
OKRA, MUSHROOM, APPLE, MANGO ETC.

OFFICE

104, Gupta Towers, Commercial Complex,
Azad Pur, Delhi - 110033
Phone No : 011-7451384, Fax No. 011-7251712

WORKS

179, H.S.I.D.C. Industrial Area, Kundli,
District : Sonapat - 131028 (Haryana)
Phone : 011-911-70379

HELPLINE COLUMN

MYCOTOXINS

Q.1. What are Mycotoxins?

Mycotoxins are a category of naturally-occurring substances that may result from fungal growth on agricultural products either in the field or during harvest and storage. In some cases, the fungi produce mycotoxins as a defence mechanism. Alternatively, the chemicals may simply be a by-products of fungal metabolism. Examples of common mycotoxins are aflatoxin, fumonisin and ochratoxin. In extremely high amounts, some mycotoxins have been found to promote cancer in laboratory animals.

Q.2. Where are mycotoxins found?

Under adverse weather-related growing conditions, such as severe drought or excessive moisture, mycotoxins may occur at low levels in some legumes and grains, such as barley, corn, millet, oats, peanuts, rice sorghum and wheat.

Q.3. What are natural carcinogens?

Natural carcinogens are components that may occur naturally in some food products that can initiate or promote the development of tumors in animals or humans. Some mycotoxins can be classified as natural carcinogens in food if

they produce cancer in laboratory animals when tested according to government protocols using extremely large doses. However, there is little evidence that these compounds are a significant public health concern in humans.

Q.4. Are there any risks from dietary mycotoxins?

A. Agricultural and food manufacturing practices in India ensure that mycotoxins do not occur in food in amounts that are significant for human health among adults, children or the elderly. In 1996, the national Academy Sciences USA released a report, *Caracinogens and Anticarcinogens in the Human Diet: A Comparison of Naturally Occurring and Synthetic Substances*. The report examined hundreds of food components, including mycotoxins, for their potential to cause or protect against cancer. The report concluded that excess calories, fat and alcohol in the American Diet pose a greater cancer risk than known naturally occurring or synthetic carcinogens in the food supply. The NAS study committee Chairman, Dr. Ronald Estabrook, University of Texas Health Southwestern Medical Center at Dallas stated, "The varied and balanced diet needed for good nutrition including

fruits and vegetables-seems to provide significant protection from the natural toxicants in our foods.

Q.5. Can mycotoxins be transmitted to humans from animals that eat contaminated feed grain?

A. There is no evidence that mycotoxins can be transferred from meat products to humans. The government of India does set limits on total mycotoxins in animal feed to protect animal health and to prevent transmission to humans through milk.

Q.6. What does the government do to minimize human exposure to mycotoxins?

A. The Prevention of Food Adulteration Act (PFA), and state agencies monitor and regulate mycotoxin levels in food for human and animal consumption i.e. 30 ppbmax. Food companies and processors have implemented their own stringent quality control limits that frequently are more protective than government standards. Government agencies and public and private research institutions are aggressively conducting research on ways to eliminate or reduce mycotoxins in the food supply. The Codex Alimentarius Commission of the United Nations is considering

adopting limits on various mycotoxins in foods for international trade.

Q.7. What are Indian agriculture, food processors and university researchers doing to minimize human exposure to mycotoxins?

A. The grain supply and related food commodities are constantly monitored by government agencies, producers, researchers, processors and seed companies. Each growing season, climatic conditions are carefully monitored to detect areas where crops may be susceptible to mycotoxins. As a normal operating procedure, millers and food processors perform sophisticated tests on inbound shipments to detect mycotoxins. Tests also are performed by food processors on outbound shipments to protect the safety of the food supply.

In addition, government academic and industry groups continue to conduct research to find ways to improve the resistance of crops to and eventually even eliminate mycotoxins. This research includes plant breeding, improved agricultural practices, processing methods and food biotechnology to eliminate mycotoxins.

Q.8. Are there ways to eliminate mycotoxins from the food supply?

A. The food industry, government

agencies and university researchers are devoting substantial financial and human resources to developing technologies that may prevent the production of mycotoxins or methods to minimize mycotoxins during storage and food processing and production.

During food production and processing the presence of mycotoxins is significantly reduced or virtually eliminated by milling, grinding and other processing methods. For example, the processes used to manufacture field corn (no sweet corn) products such as meal, flour, grits, bran, tortillas and snack foods greatly reduce the level of any mycotoxins. Ready-to-eat breakfast cereals like corn flakes and puffed or pressed corn cereals are virtually free of mycotoxins. Corn used in products such as tortillas and corn chips are soaked in a lime or alkali solution and washed, which eliminates or greatly reduces any existing mycotoxins. Fresh (on the cob or cut), frozen and canned sweet corn are virtually free of mycotoxins.

Wet-milled food products, such as cornstarch, carry little or no mycotoxin residues. In separate research projects, cornstarch was found to contain almost no mycotoxin residues. Cornstarch is the raw material used in production of corn syrup, high fructose corn syrup, food grade

starch, dextrin, modified food starch, polyols and numerous other food ingredients. Corn germ may contain minute, if any, levels of mycotoxins. Processing corn germ into corn further reduces any remaining minute levels of mycotoxins.

Additional Background Information on Mycotoxins:

Definitions of Common Mycotoxins:

- 1 Aflatoxin is produced by a fungus causing pre-harvest contamination on corn, cotton, peanuts and tree nuts. Aflatoxin levels increase slightly in drought years. It can be associated with improper storage of food commodities, primarily corn.
- 1 Fumonisin is by product of mold that is found naturally in corn and broken kernels of corn. It may be found in very low levels in some milled corn products such as snack foods, corn grits, corn bran cereals, and in even lower levels in popcorn.
- 1 Ochratoxin may be found naturally on wheat, barley, oats, coffee beans, and some foods of plant origin and animal derived food products (some meats, and dried fish).

Contributed by :

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Director,*

*Food Research & analysis Centre,
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New Delhi.*



FAIRS & SEMINARS

India Trade Fair at Tel Aviv (Israel) 3-8 May, 2000

The first India Trade Fair is being organised at the Trade Fair and Convention Centre, Tel Aviv (Israel) from 3-8 May 2000. The fair is to stimulate the potential for bilateral economic cooperation by showcasing Indian Industries' capabilities and projecting India as a partner country with an ability to supply quality and high technology, machinery and equipment. A few key sectors would be focused including processed and packed foods and concentrates.

Persons/parties interested in participation may get in touch with :

Shri. B. M. Tandon,
General Manager,
India Trade Promotion
Organisation (ITPO),
Pragati Maidan,
New Delhi -110 001.
Tel:3319564, Fax: 3371866

International Dairy Expo - 2000, Mumbai, May 1-7, 2000

The Indo-Israeli Agro Industries Chamber will hold an International exhibition called "International Dairy Expo - 2000" between 1st to 7th May, 2000 in Mumbai associated with Israel Dairy Board, Israel Asia Chamber of Commerce, Government of India and Government of Maharashtra.

For further information, contact:
Mr. Vinayakrao Bhusare Patil,
President,
Indo-Israeli Agro Industries
Chamber, 5, Arcade, World
Trade Centre,
Cuffe Parade, Colaba,
Mumbai-400 005.
Tel- 0091-22-218 6851,
Fax:- 215 5651,
E-mail: iiaic@bom7.vsnl.net.in,
vbp@bom3.vsnl.net.in

TIBCO 2000 International Fair, Bucharest, May 31 to June 6, 2000

India Trade Promotion Organisation (ITPO), has decided to have a National Pavilion at TIBCO 2000 International Fair for the consumer goods to be held in Bucharest from May, 31 to June 6, 2000.

For further details, contact:-
Mr. D.S. Chadha,
Deputy General Manager,
ITPO, New Delhi.
Tel:- 337 1481, Fax: 3318142
&
E-mail: itpo@giadl.vsnl.net.in



INFORMATION REQUIRED FOR REVIEW OF DUTY DRAWBACK RATES

The Directorate of Drawback annually reviews All Industry Rates of Drawback for various export products to consider the adequacy of the rates fixed and the modifications that may be required, by taking into consideration the changes in consumption pattern of indigenous/imported inputs used by different procedure for manufacturing exportable products and the duties suffered thereon. The data in the prescribed format in Forms DBK-I, DBK-II, DBK-III should be submitted by the industry members immediately for the purpose of review and refixing of drawback rates for the year 2000-2001.

RESEARCH ARTICLES

EFFECT OF PRE-TREATMENT AND PACKAGE ON CHEMICAL AND SENSORY CHARACTERISTICS OF DRIED APPLE

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*Division of Fruits & Horticultural Technology,
Indian Agricultural Research Institute,
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ABSTRACT

Osmotically dehydrated apple rings with a good consumer acceptability were developed and evaluated for their quality retention in different types of packages during storage at ambient temperature (13-36°C). Pre-treatments like blanching and antioxidant dip prior to osmotic dehydration in hypertonic sucrose solution for 4.5 h with a final dehydration in vacuum dehydrator were found beneficial in preventing browning and loss of nutrition in storage. The rings dehydrated by this method were attractive, palatable and crunchy in comparison to leathery texture and poor taste of conventionally dried rings. The critical point (CP) for the storage of osmo-vac dried rings was at 79.60 per cent relative humidity with 30.30 per cent equilibrium moisture content (EMC), whereas the optimum equilibrium relative humidity (ERH) was found to be 52.00 per cent at 18.56 per cent moisture. The rings quality deteriorated significantly in polyethylene and glass packages during storage study of 6 months at ambient temperature; however a minimum change in chemical composition and sensory attributes was observed in vacuum sealed laminated pouches.

INTRODUCTION

Increased production of apples in India has resulted in the availability of large quantities of lower grade fruits unsuitable for fresh fruit markets. In western countries, apples are processed into variety of products like juice, concentrate, canned sauce, canned slices, dried slices and frozen slices. However, in our country, except juice and concentrate no other product is commercially prepared. Conventional dehydration of apple leads to a product of leathery texture, dark colour, poor flavour with a loss of nutritive value.

Darkening of cut fruits due to the oxidation of polyphenols is one of the major problems in drying of fruits (Onslow, 1920). The demand for sulphur dioxide free dried fruits is increasing in health conscious peoples, but a satisfactory alternative to this for the preservation of colour and flavour is not available (Roberts and McWeeny, 1972). Ponting et al. (1966) have suggested that the osmotic dehydration of fruits in sugar syrup upto a particular moisture reduction prior to further air or vacuum drying results in better retention of fruit flavour, less

damage to colour and improvement in the taste of the dried products with a little or no use of sulphur dioxide. The main principle involved in the osmotic dehydration is the removal of water from fruit tissues by osmosis comparatively at lower temperature. A high concentration of sugar surrounding the fruit tissues prevent discolouration caused by enzymatic browning. The type of packaging material used for the storage of dehydrated products has also been reported to play a significant role in preventing the deterioration of the original colour, flavour, texture

and nutrient loss. The apple varieties which do not fetch remunerative prices to the growers can be utilized for the production of a good quality dried rings by the application of osmotic technique to meet the consumers' demand in India and abroad. Therefore, the present investigations were undertaken to develop the osmotically dehydrated rings by using different pre-treatments and evaluating their quality retention in different packages during storage at ambient temperature.

MATERIALS AND METHODS

Apples of Golden Delicious variety harvested at optimum maturity (140 days from full bloom) were procured from Himachal Pradesh and analysed for various physico-chemical characteristics like average fruit weight (125.03g), firmness (15.10 lbs/sq"), moisture (84.83%), total soluble solids (12.38%), titratable acidity (0.35% as malic acid), reducing sugars (7.21%) and total sugars (10.08%). The fruits were manually peeled and cut into uniform rings of half inch thickness with slicer. Different pre-treatments were given to the prepared slices viz, steam blanching for 3 min + dip in 0.5% potassium metabisulphite (KMS) for 30 min (T_1 , control), Osmotic dip (T_2), dip in 0.5% KMS solution for 30 min + osmotic dip (T_3), steam blanching for 3 min + osmotic dip (T_4) and dip in 0.5% ascorbic acid solution for 30 min + osmotic dip (T_5). A 70°Brix sucrose solution maintained at 50°C was used as osmotic dehydration solution for immersing the pre-treated slices

(T_2 - T_5) in 1:3 ratio for 4.5 h without any agitation. Two kg slices were used for each treatment and the experiment was replicated thrice. After 4.5 h of osmotic dip, the slices were taken out from the osmotic solution, drained, washed in water to remove the adhering syrup. The osmotic solution dipped (T_2 - T_5) and undipped (T_1) slices were further dehydrated in a vacuum drier at 82±2°C with 640 mm Hg vacuum and in a cabinet drier at 60±2°C respectively to a moisture content varying from 6-11 per cent and then packed in 150 gauge polyethylene pouches, glass jars and 220 gauge vacuum sealed laminated pouches (polyester/aluminium foil/polypropylene laminate) for shelf-life study at ambient temperature (13-36°C).

Standard analytical procedures were followed for determination of various physico-chemical parameters. Fresh fruit weight was recorded by a balance, while the firmness was measured by using Magness-Taylor Pressure Tester with 7/16" diameter plunger. The TSS of the fruit juice was measured by a hand refractometer. The moisture content, titratable acidity, ascorbic acid, non-enzymatic browning, sulphur dioxide and moisture sorption behaviour were determined by the methods described by Ranganna (1986). Sugars (reducing and total) were estimated by Lane and Eynon's (1923) volumetric method. Sensory evaluation of the dried rings was carried out for colour, flavour/taste, texture and overall acceptability by a panel comprising 7 semi-trained panelists using a nine point Hedonic scale

(Amerine et al., 1965), with a maximum score of 9 for 'like extremely' and minimum score of 1 for 'dislike extremely'. The data were analysed statistically using completely randomized design and means were compared at 5% level of significance (Cochran and Cox, 1963).

RESULTS AND DISCUSSION

The data in Tables 1 and 2 for different physico-chemical characteristics revealed a significant differences at 0, 3 and 6 months of storage. After drying, the maximum moisture content was retained in T_1 , which appears to be due to drying at atmospheric pressure. In storage, the moisture content increased in all the treatments of rings packed in polyethylene pouches and glass jars indicating that these packages did not provide a complete water vapour barrier to the product from the atmosphere; however there was no change in the product kept in vacuum packed laminate pouches. Conventionally, dried rings (T_1) after drying, recorded maximum acidity of 1.29% as compared to osmotically dehydrated ones (T_2 - T_5) for which it varied between 0.93 to 0.95% due to the reason that during osmotic dehydration the leaching of acid took place. Comparatively higher acidity in sulphited treatments (T_1 and T_3) may be due to the oxidation of free sulphur dioxide to sulphurous acid in the intercellular spaces as reported by Bhardwaj and Kaushal (1990). The reduction in acidity of osmotically treated rings (T_2 - T_5) contributed to more acceptable taste

as opposed to the objectionable taste/sugar-acid blend of conventionally dried sample (T_1) Nanjundaswamy et al. (1978) also reported a reduced acidity in osmo-air dried fruits. The acid content decreased in all the treatments and packages in 6 months of storage. Rings packed in polyethylene pouches recorded the highest reduction. The decrease may be due to the utilization of acids in the hydrolysis of non-reducing sugars upon storage. The reducing and total sugars increased on dehydration as compared to fresh samples. Conventionally dried rings (T_1) contained higher reducing (51.66%) and lower total (73.52%) sugars, but reverse trend was seen in treatments T_2 - T_5 . This was due to the effect of the osmotic dip resulting in penetration of sucrose into the rings. During storage of 6 months, the reducing sugars increased and total sugars decreased in all the treatments and packages. The increase in reducing sugars is due to the hydrolysis of non-reducing sugars. Maximum (29.91 mg/100g) and minimum (20.76 mg/100g) ascorbic acid after drying was found in T_3 and T_1 treatments, respectively. Sulphur dioxide pretreated slices resulted in maximum ascorbic acid retention. Although the slices of T_1 were also treated with sulphur dioxide, the loss of ascorbic acid may be due to its oxidation in air dehydration. Considerable reduction of ascorbic acid in all the treatments and packages was observed during 6 months of storage. The lowest ascorbic acid content of 8.01 mg/100g was found in polyethylene

pouches of T_2 , whereas it was highest in vacuum packed laminates of T_3 (23.79 mg/100g) after 6 months. This showed that the pretreatment of prepared rings with antioxidants is one of the essential requirements for higher retention of ascorbic acid during dehydration and storage. Higher retention of sulphur dioxide was observed in the rings of T_1 (331.66 ppm) after drying; however, it was within the FPO limit, where the maximum sulphur dioxide allowed in the dried apple slices is 2000 ppm. During storage, the SO_2 content decreased in all the packages with a maximum decrease in the polyethylene pouches due to permeability of these to air and gases. Comparatively more non-enzymatic browning was observed in T_2 (0.015) after drying since, no blanching/sulphur dioxide/ascorbic acid dip was given to the rings of this treatment. Similarly after 6 months of storage, the optical density for the same treatment was maximum (0.322) in polyethylene pouches as compared to others as a result of higher oxidation. Bhardwaj and Kaushal (1990) have reported that the optical density increases with the decrease of sulphur dioxide in storage of dried apple rings.

The moisture sorption behaviour data plotted in Fig. 1 show that the moisture pick up by the rings held at different relative humidities caused the deterioration of the product. The golden yellow rings with crisp and brittle texture initially turned dark, soft and mouldy with the increase in relative humidity beyond some limit. The

critical point during storage of osmo-vac dried slices was at 79.60 per cent relative humidity with 30.30 per cent equilibrium moisture content, whereas the optimum equilibrium relative humidity (ERH) was found to be 52.00 per cent (a_w 0.52) with 18.56 per cent moisture. Generally, dried products when kept at different humidities absorb or desorb moisture depending upon their water activity. Labuza et al. (1970) reported that a_w exerts a strong influence on the rates of chemical deterioration of food especially on non-enzymatic browning in dried foods. During the present study the samples at 92.00 per cent relative humidity became susceptible to moulds.

Significantly higher Hedonic rating was recorded for treatments (T_2 - T_5) given osmotic dip before vacuum dehydration as compared to control (Table 3). Pretreatments with sulphur dioxide and ascorbic acid followed by osmotic dip and vacuum drying improved the quality of the dried product to a greater extent. After dehydration, the conventionally dried (T_1) rings got a minimum score of 5.6 for the overall acceptability (OAA) mainly due to the poor taste and leathery texture. On the other hand, the rings with osmotic dip followed by vacuum dehydration (T_2 - T_5) resulted in a crunchy textured and good flavoured product. The quality deteriorated significantly during 6 months of storage. Among different treatments, the rings of T_3 scored the highest mean OAA score of 7.17 and 6.67 after 3 and 6 months of storage respectively. The

type of package used for storage played a significant role in deterioration. The quality retention irrespective of the treatment was highest in vacuum packed laminated pouches and least in polyethylene pouches. The polyethylene pouches did not act as a complete barrier for the exchange of moisture and gases. Keeping in view the deterioration occurred, it was concluded that the antioxidant pre-treatment before osmo-vac dehydration and packaging of dehydrated rings in hermetically sealed impermeable containers like foil laminates are important requirements for quality retention during transport and storage.

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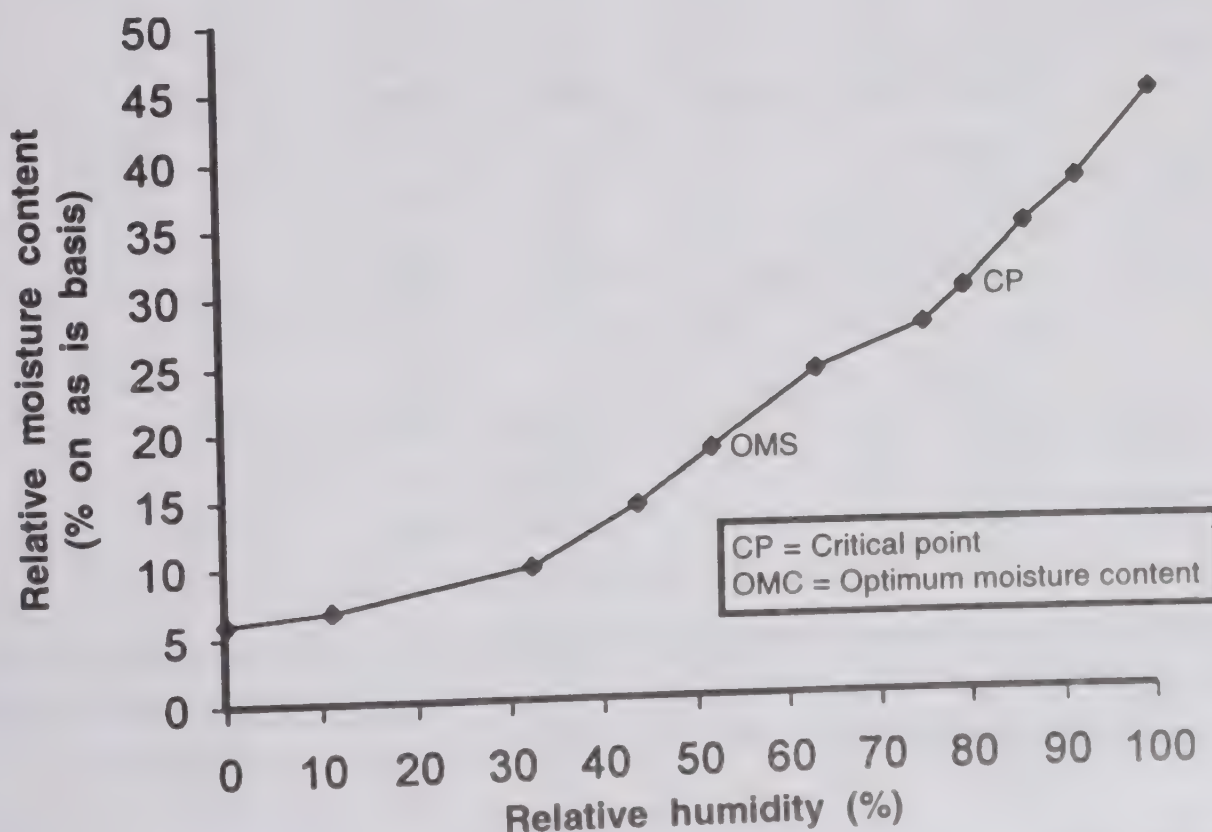


Fig. 1. Moisture sorption curve for osmo-vac dried apple rings

Table1. Chemical and Sensory Characteristics of Dehydrated Rings

Parameter	Treatment						CD(0.05)
	T1	T2	T3	T4	T5	Mean	
<u>Chemical:</u>							
Moisture %	11.62	7.24	6.76	6.86	6.77	7.85	0.19
Titrateable acidity %	1.29	0.93	0.95	0.94	0.93	1.01	0.01
Reducing sugars %	51.66	36.69	39.55	31.31	34.43	38.73	0.98
Total sugars, %	73.52	80.77	82.24	81.53	83.04	80.21	0.32
Ascorbic acid, mg/100g	20.76	23.29	29.91	23.64	29.03	25.33	1.16
SO ₂ (ppm)	331.66	-	214.00	-	-	-	-
NEB (OD at 440nm)	0.010	0.015	0.009	0.012	0.009	0.011	0.002
<u>Sensory:</u>							
Colour	6.99 0.22	6.73	7.80	6.98	7.17	7.13	
Flavour/ Taste	5.01	7.00	7.64	7.09	7.38	6.83	0.14
Texture	4.85	6.69	7.27	6.82	6.92	6.51	0.23
OAA	5.62	6.91	7.57	6.96	7.17	6.84	0.30

T₁ = Steam blanching for 3 min + potassium metabisulphite (KMS) dip in 0.5% solution for 30 min. control),
 T₂ = Osmotic dip; T₃ = KMS dip in 0.5% solution for 30 min + osmotic dip; T₄ = Steam blanching for 3
 min + osmotic dip; T₅ = Ascorbic acid dip in 0.5% solution for 30 min + osmotic dip.

Table 2. Chemical composition of dehydrated rings in different packages during storage

Parameter	Storage (month)	Packaging material	Treatment						CD (0.05)		
			T1	T2	T3	T4	T5	Mean	T	P	TxP
Moisture %	3	PP	13.78	9.48	8.10	8.96	7.93	9.65			
		GJ	12.15	7.88	7.58	7.21	7.09	8.19			
		LP	11.62	7.24	6.76	6.86	6.77	7.85			
		Mean	12.49	7.88	7.45	7.41	7.26		0.11	0.06	0.15
	6	PP	16.23	11.75	10.12	10.75	10.66	1.90			
		GJ	13.04	9.23	7.75	8.43	7.75	9.24			
		LP	11.62	7.24	6.76	6.86	6.77	7.85			
		Mean	13.63	9.41	8.21	8.68	8.39		0.31	0.17	0.28
Titratable acidity, %	3	PP	1.20	0.84	0.90	0.85	0.88	0.93			
		GJ	1.25	0.88	0.92	0.88	0.91	0.97			
		LP	1.29	0.91	0.95	0.93	0.92	1.00			
		Mean	1.25	0.88	0.92	0.88	0.90		0.02	0.01	0.01
	6	PP	1.17	0.81	0.88	0.83	0.85	0.91			
		GJ	1.22	0.85	0.91	0.86	0.89	0.95			
		LP	1.27	0.90	0.94	0.91	0.91	0.99			
		Mean	1.22	0.85	0.91	0.87	0.88		0.02	0.01	0.01
Reducing sugars, %	3	PP	53.91	38.13	40.19	33.58	35.44	40.25			
		GJ	53.97	37.62	39.88	32.07	35.19	39.75			
		LP	52.15	37.01	39.81	31.86	34.76	38.96			
		Mean	53.34	37.59	39.69	32.21	35.13		0.72	0.56	0.87
	6	PP	57.60	41.30	42.60	36.81	37.10	43.09			
		GJ	56.00	39.65	41.26	34.22	36.45	41.52			
		LP	52.74	37.16	40.10	32.50	35.79	39.66			
		Mean	55.45	39.39	41.32	34.51	36.44		0.63	0.35	0.66
Total sugars,	3	PP	74.48	80.50	82.00	81.00	84.00	80.40			
		GJ	73.13	80.42	81.59	81.56	82.56	79.85			
		LP	73.53	80.70	82.21	81.38	82.41	80.03			
		Mean	73.71	80.54	81.93	81.28	82.99		0.24	0.11	0.42
	6	PP	71.19	79.65	80.91	80.06	81.11	78.58			
		GJ	71.80	79.90	81.00	80.94	81.78	79.08			
		LP	73.23	80.61	82.14	81.73	82.30	80.00			
		Mean	72.07	80.05	81.35	80.91	81.73		0.18	0.14	0.26

continued on next page----

Parameter	Storage (month)	Packaging material	Treatment						CD (0.05)		
			T1	T2	T3	T4	T5	Mean	T	P	TxP
Ascorbic acid, mg/ 100g	3	PP	13.95	12.59	23.98	6.08	16.27	16.57	1.05	0.66	0.98
		GJ	17.02	15.83	25.74	20.35	21.71	20.13			
		LP	19.19	21.48	27.91	21.81	23.63	22.79			
		Mean	16.71	16.61	25.88	19.41	20.54				
	6	PP	9.74	8.01	17.26	8.92	10.56	10.90	0.89	0.61	0.80
		GJ	12.46	10.51	21.80	11.91	14.97	14.33			
		LP	16.61	16.04	23.79	18.19	18.73	18.67			
		Mean	12.94	11.52	20.95	13.00	14.75				
NEB	3	PP	0.131	0.078	0.055	0.089	0.125	0.096	0.04	0.02	0.07
		GJ	0.091	0.061	0.045	0.067	0.083	0.069			
		LP	0.032	0.038	0.028	0.044	0.046	0.038			
		Mean	0.084	0.059	0.042	0.066	0.085				
	6	PP	0.310	0.322	0.215	0.239	0.283	0.276	0.02	0.01	0.04
		GJ	0.245	0.285	0.197	0.216	0.253	0.239			
		LP	0.051	0.062	0.043	0.066	0.071	0.058			
		Mean	0.202	0.223	0.152	0.173	0.202				
SO ₂ (ppm)	3	PP	286.30	-	175.30	-	-	230.80	-	-	-
		GJ	300.70	-	181.70	-	-	241.20			
		LP	323.00	-	208.00	-	-	265.50			
		Mean	303.00	-	188.33	-	-				
	6	PP	228.00	-	127.00	-	-	177.50	-	-	-
		GJ	251.70	-	141.70	-	-	194.70			
		LP	311.00	-	198.00	-	-	254.50			
		Mean	295.23	-	155.56	-	-				

PP = Polyethylene pouches, GJ = Glass jars, LP = Laminated pouches, T = Treatment, P = Package, Refer Table 1 for T₁, T₂, T₃, T₄ and T₅.

Table 3. Sensory attributes of dehydrated rings in different packages during storage

Parameter	Storage (month)	Packaging material	Treatment						CD (0.05)		
			T ₁	T ₂	T ₃	T ₄	T ₅	Mean	T	P	TxP
Colour	3	PP	6.27	6.20	7.33	6.52	6.12	6.49			
		GJ	6.36	6.32	7.58	6.60	6.38	6.66			
		LP	6.70	6.54	7.72	6.82	6.94	6.94			
		Mean	6.44	6.35	7.55	6.64	6.48		0.18	0.12	0.25
	6	PP	5.25	5.29	6.58	5.30	4.97	5.48			
		GJ	5.53	5.46	7.06	5.21	5.64	5.78			
		LP	5.85	5.70	7.60	6.25	6.21	6.32			
		Mean	5.54	5.48	7.08	5.58	5.60		0.23	0.19	0.30
Flavour	3	PP	4.74	6.45	6.92	6.52	6.60	6.24			
		GJ	4.90	6.58	7.17	6.60	6.72	6.40			
		LP	4.98	6.77	7.52	6.84	6.98	6.61			
		Mean	4.87	6.60	7.19	6.65	6.76		0.10	0.08	0.15
	6	PP	4.07	5.58	6.26	5.36	5.43	5.34			
		GJ	4.26	5.79	6.67	5.32	5.55	5.52			
		LP	4.56	5.95	7.09	6.14	6.09	5.96			
		Mean	4.29	5.77	6.67	5.60	5.69		0.11	0.09	0.12
Texture	3	PP	4.53	6.15	6.88	6.30	6.54	6.08			
		GJ	4.60	6.40	6.46	6.50	6.65	6.12			
		LP	4.70	6.62	6.98	6.64	6.84	6.35			
		Mean	4.61	6.39	6.77	6.48	6.67		0.06	0.05	0.09
	6	PP	4.18	5.22	5.79	5.64	5.68	5.30			
		GJ	4.47	5.52	6.07	5.82	5.75	5.52			
		LP	4.68	6.47	6.94	6.23	6.31	6.12			
		Mean	4.44	5.73	6.26	5.89	5.91		0.15	0.10	0.18
OAA	3	PP	5.18	6.27	7.04	6.45	6.43	6.29			
		GJ	5.28	6.43	7.07	6.56	6.58	6.38			
		LP	5.46	6.64	7.40	6.76	6.92	6.64			
		Mean	5.28	6.44	7.17	6.59	6.64		0.18	0.15	0.25
	6	PP	4.51	5.37	6.21	5.49	5.36	5.39			
		GJ	4.75	5.59	6.60	5.45	5.64	5.60			
		LP	5.03	6.04	7.21	6.20	6.20	6.13			
		Mean	4.76	5.66	6.67	5.71	5.73		0.26	0.21	0.34

T = Treatment, P = Package, OAA = Overall acceptability, Refer Table 1 for T₁, T₂, T₃, T₄ and T₅.

CONTROL OF BROWNING IN WHITE BUTTON MUSHROOM (*Agaricus bisporus*)

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ABSTRACT

The effect of different antibrowning agents viz., ethylene diamine tetraacetic acid (EDTA), citric acid (CA), calcium chloride (CC), potassium metabisulphite (KMS) and hydrogen peroxide (HP) in controlling the browning in white button mushroom was investigated. The individual dipping treatments in 0.0125% EDTA, 3.0% HP and 0.05% KMS showed significant improvement in quality of both the fresh as well as stored mushrooms for 72h and 96h at room temperature (RT) (10 to 14°C) and lower temperature (LT) (6°C) respectively. However, the combined treatment with 3.0% HP + 0.0125% EDTA resulted in more whiter mushrooms than above mentioned treatments both immediately after dip and after storage for 72 and 96 hours at RT and LT.

INTRODUCTION

Mushrooms being perishable in nature, requires some prestorage treatment before its storage for a longer period. The market value/demand of white button mushroom (*A. bisporus*) at the point of sale is determined by different quality parameters like its whiteness, toughness and fruitbody shape, etc. (Mac Canna and Gormley, 1966; Berendse, 1984). The whiteness of the fruitbody is the most important quality parameter and loss of whiteness during storage reduces their market value appreciably (Burton and Noble, 1993). The deterioration in the colour of the fruitbodies is a multistep reaction (Dawley and Flundy, 1993) catalysed by the enzyme polyphenol oxidase. Physical and chemical factors reducing the activity of this enzyme prove useful in controlling the browning problem (Rai and Saxena, 1989; Sahni et al., 1998).

Among the chemicals, sulphites (potassium metabisulphite) have been commonly used due to their effectiveness, cost and strong penetration capacity (Taylor et al., 1986) but with the increasing awareness about their harmful effects on health and their recent ban in USA by FDA (Anon, 1990), their use is being discouraged. In order to develop safe and effective browning inhibitors for mushrooms, several other chemicals like, sodium erythorbate, cysteine hydrochloride, EDTA and hydrogen peroxide have been investigated for their role in controlling browning (Sapers et al., 1994; Sapers et al., 1995). The chemicals like EDTA and hydrogen peroxide have been reported effective either at very high concentrations (EDTA @ 1000ppm) (Mau et al., 1993) or in a range of concentration (hydrogen peroxide @ 3-5%) (Sapers et al., 1995), which is not cost effective as compared to commonly used sulphites. In view

of the above, a study was undertaken to find out some other chemicals or more suitable concentrations of the already reported chemicals for improving the whiteness and shelf life of white button mushroom.

MATERIALS AND METHODS

Freshly harvested white button mushrooms of uniform size (30 ± 2 mm cap diameter) were selected for the experiment and initial data was recorded by the method of Rai and Saxena, 1989a. Preliminary screening of the chemicals for their effect on quality and shelf-life of the button mushrooms was done by giving dip treatments with 0.05% of potassium metabisulphite (KMS); 0.0125% and 0.025% of ethylene diamine tetra acetic acid disodium salt (EDTA); 1,2,3 and 4% of hydrogen peroxide (HP); 0.1% of calcium chloride (CC) and 0.1% of citric acid (CA) and

keeping unwashed and water washed mushrooms as control treatments. The different dip treatments including undipped, water dipped, KMS (0.05%), EDTA (0.0125%), EDTA (0.025%), CC (0.1%), HP (1.0%), HP (2.0%), HP (3.0%), HP (4.0%) and CA (0.1%) were designated as T1, T2, T3, T4, T5, T6, T7, T8, T9, T10 and T11 treatment respectively. The mushrooms in each treatment were dipped for 10 minutes in different solutions and then spread on paper for one hour at room temperature. The mushrooms obtained after different dip treatments were recorded for their whiteness and placed in polypropylene bags (100 gauge, 22x15cm) before storing at room temperature (RT, 12°C) and lower temperature (LT, 6°C). After storage for 48 hours at RT and 96 hours at LT, whiteness and other changes were recorded.

After initial screening, the treatment with 0.05% of KMS, 3.0% of HP and 0.125% of EDTA were selected for their individual as well as combined use, while 0.1% of CC and 0.1% of CA were selected for their use only in combination either with HP (3.0%) or EDTA (0.0125%) or both. Mushrooms without any dipping treatment and water dipping were again kept as the control treatments for comparison. The undipped, water dipped, EDTA (0.0125%), KMS (0.05%), HP (3.0%), CC (0.1%), HP (3.0%)+EDTA (0.0125%), HP (3.0%)+CC (0.1%), EDTA (0.0125%)+CC (0.1%), HP (3.0%)+EDTA (0.0125%)+CC (0.1%) and HP

(3.0%)+EDTA (0.0125%)+CA (0.1%) dip treatments were designated as T1, T2, T3, T4, T5, T6, T7, T8, T9, T10 and T11 treatment respectively. The observations for whiteness immediately after dip and on storage for 72h and 96h at RT and LT respectively were recorded in same fashion as in individual chemical dip treatments.

RESULTS AND DISCUSSION

In dip treatments with individual chemicals the whiteness of fresh mushrooms observed immediately after dip was significantly high in T4, T5, T3 and T9 treatments (Table-1). On storage for 48 hours at RT the loss in whiteness was significantly less in T4, T5, T3 and T9 treatments. However, on storage for 96 hours at LT the loss in whiteness was minimum in T4 treatment followed by T9 and T3 treatments (Table-2).

In dip treatments with different combinations of chemicals, it was recorded that mushrooms obtained after T10 treatment retained significantly higher whiteness on their storage for 96 hours at RT, followed by T7 and T8 treatments (Table-3). However, on storage under refrigerated conditions, the whiteness of mushrooms recorded in T7 and T11 was superior.

In our earlier study also, the mushrooms dipped in 0.0125% EDTA were found to have better quality and shelflife on storage (Ahlawat et al., 1998). Several other workers have suggested the use of EDTA as anti browning agent in mushrooms but at a

higher concentration (1000 ppm) than the present findings (Sapers et al., 1994). The use of HP as an antimicrobial agent has also been reported in mushrooms both, as vapour treatment as well as dip treatment (Sapers et al., 1995). The combined use of these two chemicals has also been reported earlier but with 1.0% of HP (vapour) and 0.1% of calcium disodium EDTA (Mc Connel, 1991; Mau et al., 1993). Although our findings are in agreement with the findings of the above workers, the effective concentration of EDTA was found to be 8 times less than that recorded by Mc Cannel (1991) and Mau et al. (1993). We also found the precise concentration of HP (3.0%) suitable for treatment, while others have suggested a range (3-5%) Sapers et al. (1995). The combined treatment of HP and EDTA was found to maintain the quality of mushrooms, even after 3 days of storage at 10°C and 4 days at 6°C (Fig. 1a and 1b). The washing treatment with KMS although improved the initial whiteness, but failed to retain the quality for longer period rather showed deterioration symptoms (yellowing and blackening) particularly on stipe. The CA dip treatment both individually as well as in combination with HP and EDTA was found to stimulate the deterioration of mushroom stipe on storage especially at the cut portions (Fig.2a and 2b). So, by giving combined dip treatment with 3.0% of HP and 0.0125% of EDTA, white button mushrooms can be stored for about 3 days at 10°C and 4 days at 6°C without losing

the quality of the mushrooms.

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Table-1 Effect of different dip treatments on the whiteness of white button mushroom (*A. bisporus*) on storage at ambient temperature of 12°C for 48 hours

Treatment	Initial whiteness (L-Value)	Whiteness after washing treatment (L-Value)	Whiteness after storage (L-Value)
T1	69±0.9	69±0.9	59.6±2.5
T2	69.4±1.3	70.6±2.5	61.2±3.2
T3	71±1	74.6±1.0	70.2±1.3
T4	68.4±1.7	73.6±2.2	69.0±2.6
T5	69.2±1.3	73.6±1.6	66.2±3.6
T6	73.4±1.0	75.0±2.2	70.2±2.5
T7	69.6±2.7	72.0±1.7	60.0±2.3
T8	70.0±1.7	72.8±0.8	68.2±1.3
T9	67.0±0.9	70.8±2.2	65.8±2.0
T10	66.2±2.1	68.6±1.8	64.0±2.0
T11	66.8±2.2	66.2±2.8	60.2±2.6

±, SEM.

Table-2 Effect of different dip treatments on the whiteness of white button mushroom (*A. bisporus*) on storage at refrigerated temperature of 6°C for 4 days.

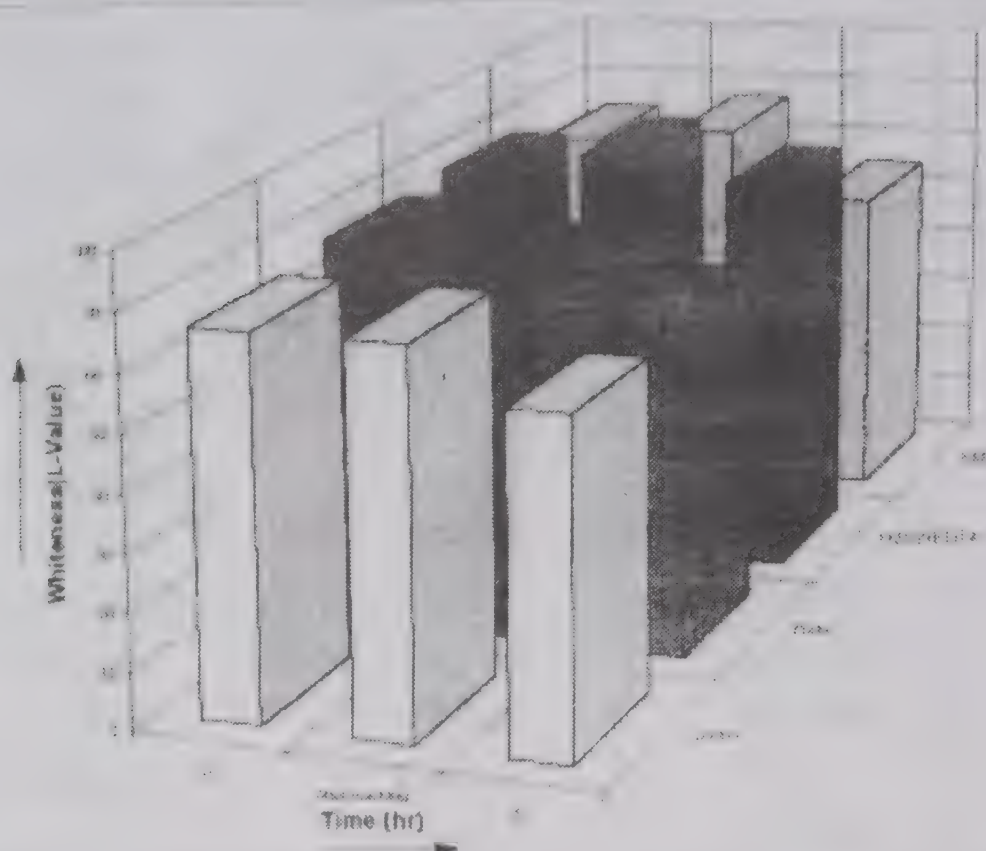
Treatment	Initial whiteness (L-Value)	Whiteness after washing treatment (L-Value)	Whiteness after storage (L-Value)
T1	70.2±2.1	70.2±2.1	65.0±2.3
T2	66.2±2.2	67.2±0.9	55.6±3.2
T3	67±1.1	71.2±0.9	63.4±4.8
T4	68.8±2.1	73.4±2.4	66.8±4.8
T5	64.8±2.5	69.4±1.5	60.0±3.4
T6	67.6±2.8	69.8±2.7	61.2±4.6
T7	70.2±1.9	70.8±1.1	60.6±1.0
T8	69.2±0.5	70.2±1.5	65.4±3.0
T9	69.4±2.2	72.0±1.5	66.6±2.4
T10	70.4±2.6	70.2±2.2	57.2±3.6
T11	64.8±2.0	65.8±0.9	55.0±2.9

±, SEM.

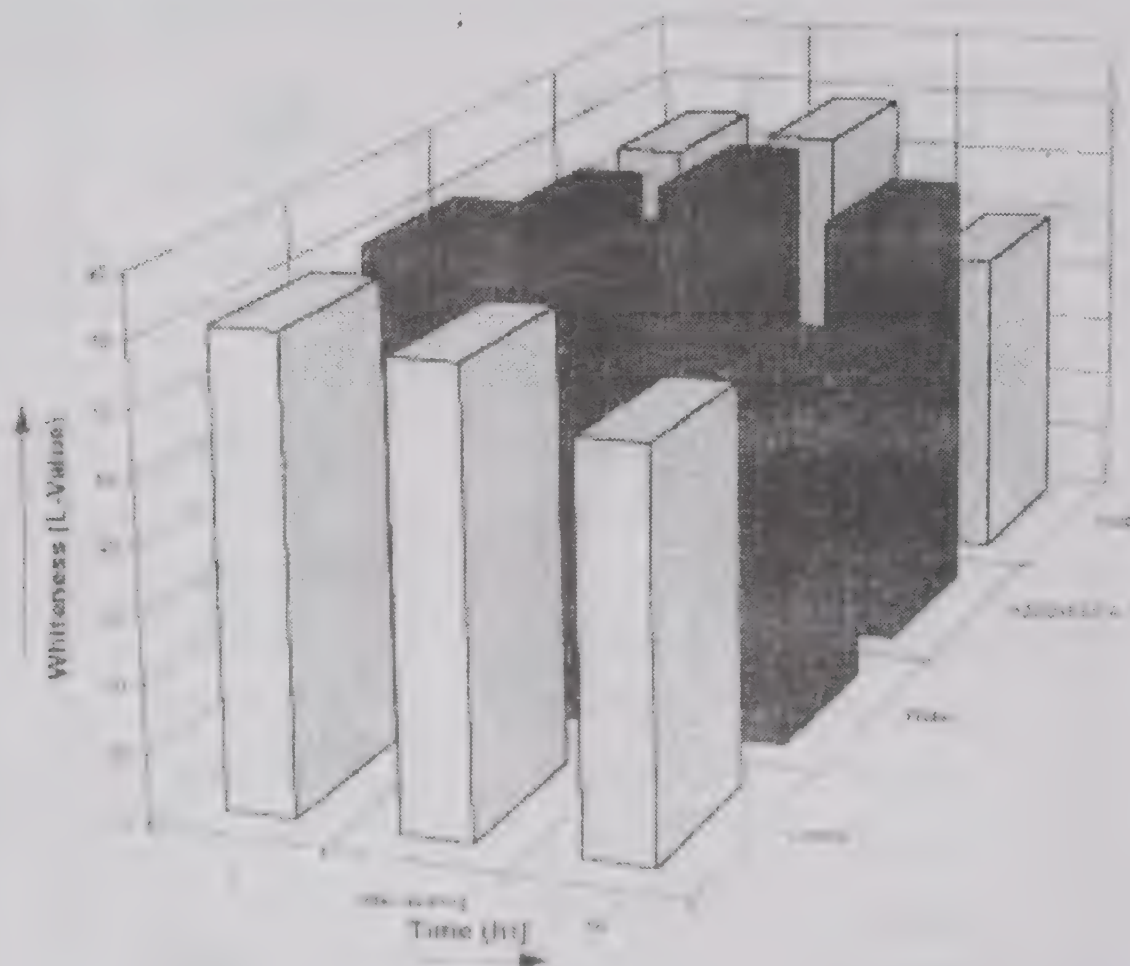
Table-3 Effect of different combination of dip treatments on the whiteness of white button mushrooms (*A. bisporus*) stored at 10°C for 3 days and at 6°C for 4 days.

Treatment	Storage at 10°C		Storage at 6°C	
	Initial whiteness (L-Value)	Whiteness after storage (L-Value)	Initial whiteness (L-Value)	Whiteness after storage (L-Value)
T1	64.0±2.4	57.6±3.0	71.6±1.3	60.0±3.1
T2	67.6±2.6	58.6±3.1	71.4±1.0	54.8±2.5
T3	68.2±1.8	65.2±2.7	67.8±2.6	62.4±2.7
T4	64.2±2.6	56.0±4.4	69.2±1.8	50.4±1.7
T5	67.0±3.2	62.0±4.3	69.4±2.8	51.0±3.5
T6	68.2±1.4	61.0±1.7	65.0±2.6	49.8±5.7
T7	67.8±2.0	68.8±2.3	66.6±3.0	66.6±3.0
T8	70.4±1.7	66.2±1.8	68.0±1.8	55.0±7.6
T9	63.4±1.3	62.4±2.5	67.2±1.9	58.2±3.5
T10	65.2±1.4	65.4±1.9	68.0±1.8	57.2±3.1
T11	70.6±2.3	68.2±2.1	63.8±2.1	62.6±3.8

±, SEM.



1a: Effect of dip treatment with water, KMS and EDTA, HP on the quality and shelf-life of *A.bisporus* during storage under (a) ambient and in (b) refrigerated conditions



1b: Effect of different dip treatments on the shelf-life of *Agaricus bisporus*.

EVALUATION OF SOME BIOCHEMICAL CONSTITUENTS OF LUNGRU (*DIPLAZIUM ESCULENTUM*)

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ABSTRACT

Physico-chemical constituents of *lungru* (*Diplazium esculentum*), an edible fern grown and consumed in different parts of the world was studied. Study indicates that it is a good source of nutrients and can be safely included in our diet.

INTRODUCTION

Lungru (*Diplazium esculentum*) is an edible fern. It has an erect, stout, sub-arborescent rhizome of 2-pinnate fronds, slightly scaly, grooved, erect and tufted. It occurs in thickets in cool, moist and shady places at an altitude ranging from 1000-2200 meters. In north, it begins to grow in March and April, reaches to its full luxuriance in May/ June and dies down in September. Locally, lungru is used to make vegetable curry and pickle and is considered as delicacy during the glut season. Since, there is a lack of information on its nutritional quality, the present study was undertaken to study some of the biochemical constituents of lungru.

MATERIALS AND METHODS

Fresh samples of lungru were procured from the local market. An effort was made to have the lungru of uniform maturity and harvest in order to minimize the error. All the parameters for fresh lungru were analyzed using standard methods.

Anti-nutritional factors viz. condensed tannins and total phenols were assessed in lungru samples, subjected to different heat treatments i.e. sun-drying (12 hrs. at $31^{\circ}\pm 2^{\circ}$ C), shade-drying (3 days at ambient temperature), oven-drying (8 hrs. at 75° C) and vacuum-oven drying (10 hrs at 60° C). Total Folin-Ciocalteu reagent (Julkunen - Tiitto, 1985) was used for determination of total phenols and the condensed tannins were determined by vanillin - HCl reagent (Broadhurst and Jones, 1978).

RESULTS AND DISCUSSION

Vegetables being a good source of vitamins and minerals are always recommended in diet. Data with respect to mineral content of lungru is presented in Table 2. Mineral figure helps in identifying the food and its quality. Also, they serve as a constituent of skeletal structures, as regulating acid-base equilibrium and as a component or an activator of enzyme. Higher amount of calcium was found in lungru followed by magnesium and

phosphorus. The values were found to be in consonance with various ferns and fern allies as reported by Hou (1950).

Results obtained regarding anti-nutritional factors indicated that tannin content and total phenols content decreased with increase in temperature. In shade-dried samples, the tannins and total phenols were maximum followed by sun-dried, vacuum-oven dehydrated and oven-dehydrated samples and all these treatments varied highly significantly when compared with each other. The variation among the different treatments can be directly attributed to the effect of drying or dehydration on the respective treatments because drying changes the chemical properties of the products. Same has also been observed by Price et al. (1980) and Padmaja (1989) in cassava leaves and various beans.

Results of the study showed that pH of fresh lungru was towards the acidic side i.e. 5.53. The pH

of a food is important for it affects many other functional properties such as colour, flavour and texture of food. The most important factors which are believed to have an effect on pH value are variety, maturity, seasonal variations due to growing conditions, geographical areas and processing variables. The free fatty acid content of lungru was 0.03 percent as oleic acid. It has the advantage of giving an impression of the acidity of oil or fat as percentage. Alcoholic acidity of lungru was found to be 0.03 percent as H_2SO_4 where as that of ascorbic acid was found to be 5.80

mg/100g.

Based on the above study, it can be concluded that lungru is a good source of nutrients and can be included safely in our diets.

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Table 1

pH, free fatty acids, alcholic acidity and ascorbic acid content of lungru on fresh weight basis.

Parameter(s)	Mean value
pH	5.53
Free fatty acids (% as alcholic acid)	0.03
Alcholic Acidty	0.03
Ascrobic acid (mg/100g)	5.80

Table 2
Mineral Composition of lungru

Mineral (s)	Mean value
Calcium*	0.08
Magnesium*	0.07
Phosphorous*	0.06
Sulphur*	0.03
Sodium*	0.01
Iron**	8.40
Manganese**	5.60
Zinc**	5.30

* Value in g/100g

** Value in mg/100g

Table3
Condensed tannins(%) and total phenols content(%) of dried /dehydrated Lungru treatments.

Parameters	Dried / dehydrated			
	Sun	Shade	Oven	Vaccum oven
Condensed Tannins(CT)	1.27	1.78	0.38	0.92
Total Phenols(TP)	2.91	3.12	2.40	2.72

C.D. Value at 5% level of significance

CT = 0.06

TP = 0.07

SHELF-LIFE OF NOODLES/VERMICELLI FROM MAIZE AND RICE

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ABSTRACT

Noodles/vermicelli from maize and rice prepared with or without antioxidant (tertiary butyl hydroquinone, TBHQ) were packed in cast polypropylene (CPP) and a laminate of metallised polyester with low density polyethylene (M-PET/PE). The packs were stored at 38°C, 92%RH (accelerated storage) and 27°C, 65% RH (normal storage) for 100 to 140 days. Solid loss of the product upon cooking decreased from 12.4% to 7.6% at accelerated storage and to 9.6% at normal storage. Firmness and elasticity of the cooked product however increased upon storage. The sensory properties of the cooked product remained good upto 100 days at both the storage and packaging conditions.

INTRODUCTION

Noodles / vermicelli are breakfast or snack foods consumed not only in India but in many other countries. Traditionally, the product is made from wheat. However, rice noodles / vermicelli are also common in many rice consuming countries of South and South-east Asia. In India, rice vermicelli is made and consumed fresh. A shelf-stable convenience product has appeared in the Indian market in recent times. We have recently developed processes for the preparations of shelf-stable noodles/vermicelli from maize and rice. Their storage profile was tested to provide an effective and economical package design for an extended shelf life of the product and the results are reported in this paper.

MATERIALS AND METHODS

Maize (yellow variety) and milled rice (IR 20 variety) were procured from local Mysore market. The Maize was cleaned, conditioned for 15 min

after adding 4% extra water with thorough mixing and milled in a maize mill set up at the laboratory. Grits free of bran and germ were separated and were used for the preparation of noodles as per the method of Sowbhagya and Ali¹. Noodles from milled rice were prepared as per the process of Sowbhagya and Ali². The noodle strands were collected as circular discs of about 7.5 - 8.0 cms dia over flat surface. The dried discs weighed 6-7g each.

The moisture content was determined by hot air oven method³. The peroxide value (PV) was determined by the colorimetric ferric thiocyanate method⁴. Free fatty acids (FFA) as percent oleic acid were determined by titrating against isopropanolic potassium hydroxide⁵. Total fat content was determined by extraction of ground sample in hot petroleum ether (60°C-80°C) using Soxhlet apparatus⁶. The sensory analysis was done for the cooked

noodles for its rancid odour, taste and texture⁴. Firmness and Elastic recovery of the cooked noodles was measured using a viscoelastograph⁷. The solid loss was determined according to IS 1976.⁸

Moisture sorption studies: The noodles were kept in Petri dishes and exposed to relative humidities, ranging between 11-92% by using appropriate saturated salt solutions at 27°C.⁹ The samples were weighed at regular intervals until they attained constant weight or showed signs of microbial growth. After this they were analysed for different parameters to determine their acceptability.

Selection and barrier properties of packaging materials: The WVTR requirement, for about one and a half months and six months shelf life of the product under 92% RH/ 38°C (which simulates coastal climatic conditions where this type of traditional food product is most popular) was calculated using "Clipark" software developed at

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CFTRI.¹¹ The calculations show that WVTR of 4.0 and 1.0 gives the required shelf life. As can be seen from Table-1, 62 micron CPP (WVTR 4) and 12 micron Metallised polyester / 37 micron polyethylene (WVTR 0.0) were selected for the study.

Storage: Unit pouches made from metallised polyester / polyethylene (M-PET/PE) and cast polypropylene (CPP) with 50g product were used for packaging. The packets were stored at 65% RH, 27°C (normal) and 90% RH, 38°C (accelerated conditions). The pouches were withdrawn periodically and analysed for different parameters.

RESULTS AND DISCUSSION

Moisture sorption behaviour: The moisture sorption behaviour of both maize and rice noodles was essentially similar and hence data are presented for noodles from rice. Observation on the product for each storage condition is presented in Table 2. The sorption isotherm curve (Fig.1) shows a sigmoid shape characteristics of starch-protein rich foods. Both rice and maize noodles had perceptible rancid smell at 32% RH and above and became soft and unacceptable beyond 65% RH. Fig.2 shows the moisture pickup by the rice and maize noodles, stored at 27°C at different humidities. The Guggenheim - Anderson and de Boer (GAB) model (which generally fits up to a water activity of 0.92 - 0.94) when applied to the moisture sorption data of the noodles had a correction coefficient >0.98 with very low standard error. The monomolecular moisture content as determined by the GAB plot¹² was

found to be 5.9% below which oxygen sensitive product would be susceptible to rapid oxidative deteriorations.

The FFA content increased with increase in humidity of the storage condition. The other parameters like solid loss during cooking, colour of the product, and its texture remained more or less same in all the seven samples equilibrated to 11%-75% RH. None of the cooked noodles had any rancid smell or taste. Thus the non-dependence of PV and dependence of FFA on RH indicates that the low fat content of the product (0.5-0.7%) appeared to be moisture sensitive. Hence a moisture content level of 8 to 12% appears to be critical for storage of the product.

Storage behaviour : The storage behaviour of rice and maize noodles / vermicelli was almost similar. The M-PET/PE has better barrier properties to oxygen and water vapour than CPP. Even then perceptible rancid smell was observed at 20 days itself at 92% RH, 38°C and at 51 days for 65% RH, 27°C. The solid loss became less, the firmness and the elastic recovery increased after about 40 days and remained more or less similar in both the storage conditions thereafter. There was no difference in moisture pickup between the three types of noodles studied in both the packages under the storage conditions studied. Data representing moisture changes in rice noodles is therefore presented in Fig.2 as a representative one.

Under accelerated storage conditions, the product with initial moisture content of 8% increased

gradually to reach critical moisture content of 12% within 40 days in CPP terminating the shelf life of the product as against calculated 45 days (Fig.2). This may be due to the increased WVTR of packaging materials due to interaction between broken edges of the noodles and packaging materials. Under the same conditions in M-PET/PE, the critical moisture was reached at the end of 150 days as against calculated 180 days. However, under normal storage conditions the equilibrium moisture content (EMC) of the product itself was only 12%; the product can therefore never cross the critical moisture content even in unpacked conditions. This 12% MC was reached faster in CPP. It was still very close to initial moisture content even at the end of 135 days storage.

Changes in free fatty acids: The FFA values increased with time in all the combinations studied. There was no essential difference in the extent of change of FFA between two types of maize noodles i.e, with and without antioxidants. As can be seen from Figs.3 and 4, the rate of FFA increase was more in maize noodles and was in commensuration with the moisture content of the product as indicated by sorption studies. Under normal storage conditions, the FFA changes were almost similar in both the packaging materials. The changes in FFA with time could be described by polynomial models of different degrees.

Changes in peroxide value(PV): The PV changes observed during storage were erratic and so no conclusions could be drawn. However, contrary to the observation from the sorption

test, rancid odour was smelt as soon as the pouches were opened within 15 days of storage. The product, even though had low fat content, was found to be oxygen sensitive also. The head space oxygen available in pouch was sufficient to cause off-flavour in the product which affected adversely the shelf life of the product. It was more so in case of M-PET/PE which has higher oxygen barrier (OTR 20), perhaps due to the fact that the breakdown products contributing to the off-flavour could not escape through the pouch and tainted the product. Slight rancid odour could be smelt as soon as the M-PET/PE pouch was opened at the end of 20 days at 92% RH, 27°C storage. However, the cooked noodles were entirely free from rancid odour till 100 days storage. At 65%RH, 27°C storage in the M-PET/PE, rancid smell could be detected only after 51 days. Again in this also the cooked product was free from any rancid odour till 100 days of storage period. The addition of antioxidant did not help in the extension of shelf life. May be the added antioxidant was destroyed during the preparation of noodles/vermicelli.

Changes in other properties: The results with respect to changes in solid loss

during cooking, firmness and elasticity and sensory evaluation of the cooked products are summarised in Tables 3,4,5 and 6 respectively. It could be seen from Tables 3 and 4 that solid loss decreased with storage time both at normal as well as at accelerated storage conditions. The texture of the product improved with storage as reflected by an increase in the firmness and elastic recovery values (not shown), in both the storage conditions. The sensory evaluation of the cooked sample as shown in Tables 5 and 6 was rated good and acceptable upto 100 days of storage at both the storage conditions. The ash content of maize and rice noodles was 1.47% and 1.55% and that of protein 6.5% and 8.2% respectively, on dry weight basis. The ash content was slightly higher and protein content was slightly lower in comparison to those specified for wheat vermicelli.

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Table 1 : Properties of the packaging materials and pouch used

Parameter	PP*	M-PET/PE**
Thickness (μm)	62	49
Water Vapour Transmission rate (g/m ² , 24h) at		
a) at 27°C/65% RH	1.2	0.25
b) at 38°C/90% RH	4.0	0.80
Oxygen transmission rate (ml/m ² , 24 atm)	2000	25
Size of pouch (cm)	13 x 18	13 x 18

Polypropylene

* Metallised polyester / low density polyethylene of thickness 12 μm / 37 μm .**Table 2: Moisture sorption behaviour of rice noodles exposed to different relative humidity conditions at 27°C.**

RH(%)	Equilibrium moisture content (db)	Observation	
		Dry	Cooked
11	5.6	V.brittle- breaks easily	Good
22	6.4	V. brittle V.sl.rancid smell	Good
32	8.1	Sl. brittle V.sl.rancid smell	Good
44	9.4**	Crisp but not brittle; perceptible rancid smell	Good
56	11.2	Crisp, rancid smell	Good
65	12.1	Crisp; rancid Smell more than above.	Good
75	14.0	Soft, rancid	-
86	18.9	Mould growth observed after 45 days.	-
93	25.9	Mould growth observed after 15 days.	-

** Critical Moisture Content.

Table 3: Solid loss during cooking of noodles stored at 65% RH and 27°C

Noodle samples	Anti oxidant (TBHQ)	Storage time (days)			
		0	51	76	100
<u>CPP Packing</u>					
Maize	-	9.2	6.9	6.4	6.6
Maize	+	8.8	6.9	7.0	6.9
Rice	-	19.3	16.4	17.0	7.1
<u>M-PET/PE</u>					
Maize	-	9.2	6.9	6.9	12.4
Maize	+	8.8	5.8	6.9	7.2
Rice	-	19.3	11.2	16.5	17.1

Table 4: Solid loss during cooking of noodles stored at 92% RH and 38°C

Noodle samples	Anti oxidant (TBHQ)	Storage time (days)					
		0	20	51	56	76	100
<u>CPP Packing</u>							
Maize	-	9.2	6.8	6.0	6.6	4.9	5.3
Maize	+	8.8	6.9	7.0	6.0	6.0	4.3
Rice	-	19.3	18.5	15.9	18.2	11.4	11.1
<u>M-PET/PE</u>							
Maize	-	9.2	7.0	7.2	6.1	6.8	6.0
Maize	+	8.8	8.1	6.6	7.5	6.2	4.4
Rice	-	19.3	12.1	13.9	12.1	11.8	11.3

Table 5: Sensory properties of noodles cooked after storage at 65% RH, 27°C

Samples	Anti oxidant (TBHQ)	Storage time (days)					
		0	51	76	100	139	167
<u>PP Packing</u>							
Maize	-	good	good	good	good	good	good
Maize	+	good	good	good	good	Sl.bitter after taste	Sl.bitter after taste
Rice	-	good	good	good	good	good	pasty
<u>PET/PE</u>							
Maize	-	good	good	good	good	Sl.bitter after taste	Sl.bitter after taste
Maize	+	good	good	good	good	Sl.bitter after taste	Sl.bitter after taste
Rice	-	good	good	good	good	Sl.bitter after taste	Sl.bitter after taste

Table 6: Sensory properties of noodles cooked after storage at 92% RH, 38°C

Samples	Anti oxidant (TBHQ)	Storage time (days)				
		0	20	51	76	100
<u>PP Packing</u>						
Maize	-	good	good	good	good	good
Maize	+	good	good	good	good	good
Rice	-	good	good	good	good	good
<u>PET/PE</u>						
Maize	-	good	good	good	good	good
Maize	+	good	good	good	good	good
Rice	-	good	good	good	good	good

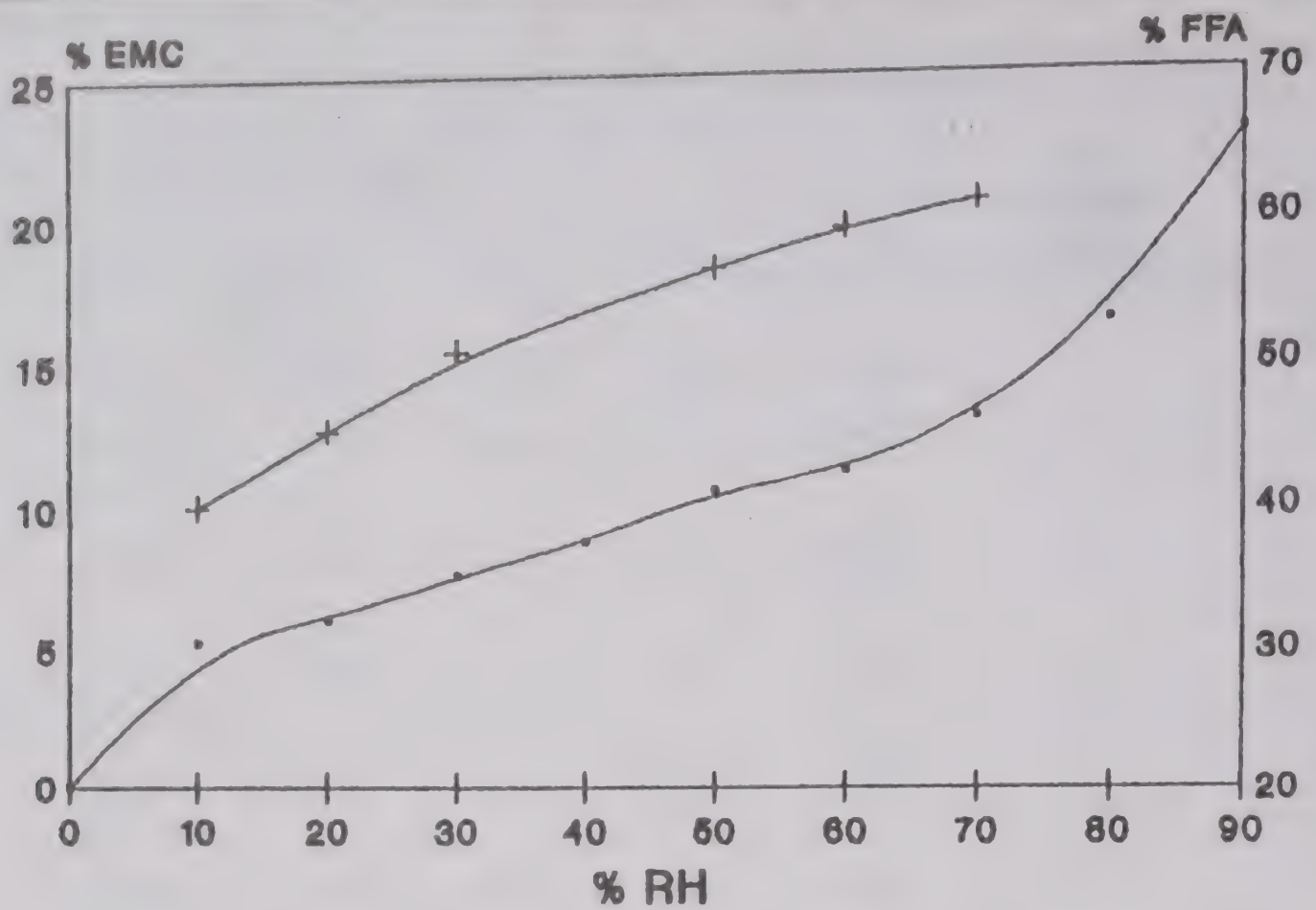


Fig. 1

Moisture Sorption isotherm of Rice Noodles at 27°C

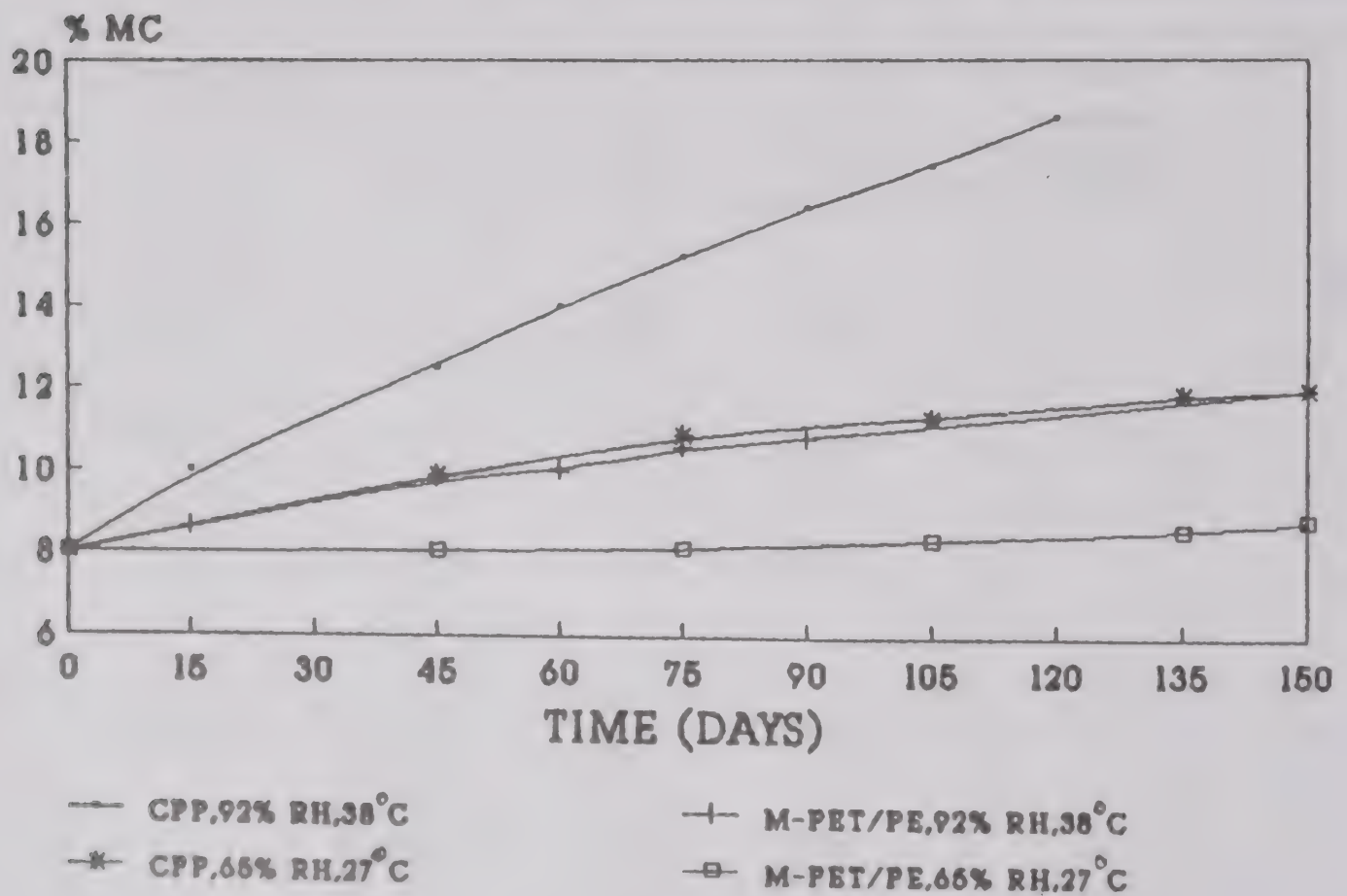


Fig. 2

% MC in Rice Noodles during Storage

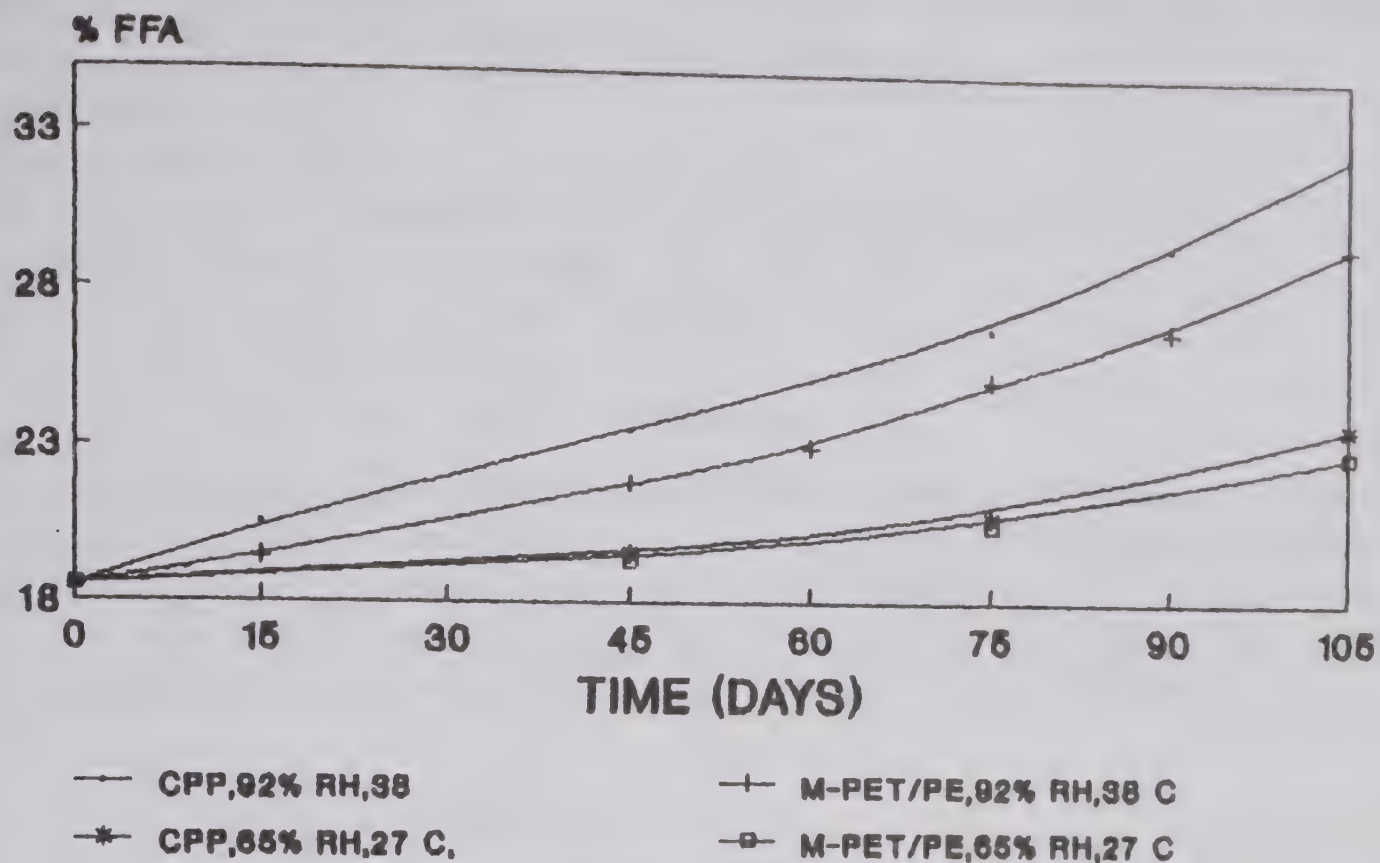


Fig. 3

% FFA Changes During Storage in Rice Noodles

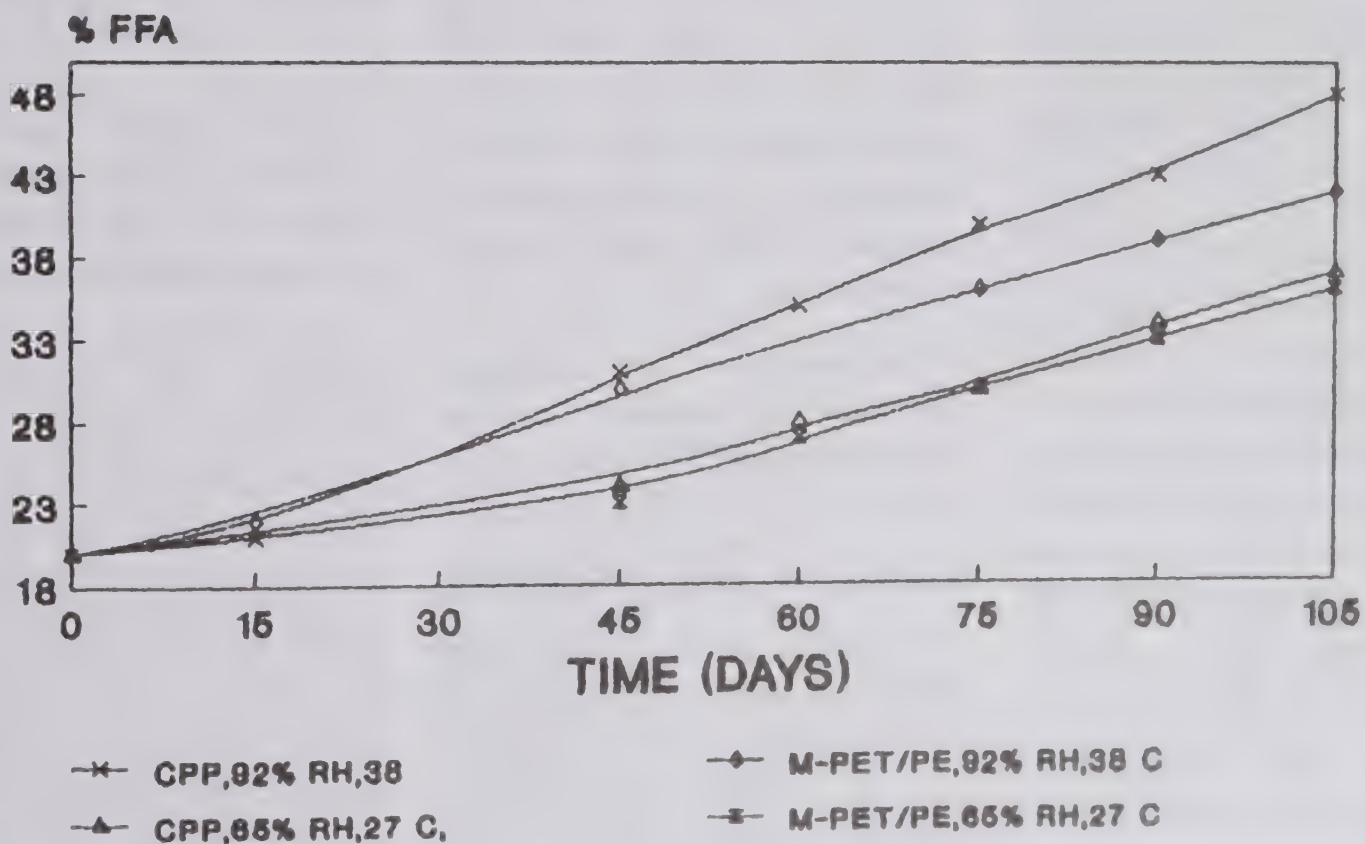


Fig. 4

% FFA Changes During Storage in Maize Noodles

STANDARDIZATION OF RECIPE FOR PREPARATION OF SWEET PAPAYA CHUTNEY

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ABSTRACT

In order to standardise the recipe for sweet papaya chutney, various treatments were evaluated. Among these treatments, T8 in which 5 per cent salt, 0.8 per cent red chilli powder, 1.5 per cent *garam masala* (spices), 75 per cent sugar, 2.5 per cent raisin (*kismis*), 5 per cent sliced dried dates and 0.8 per cent glacial acetic acid (based on the weight of papaya shreds) were used and was found to be most acceptable upto 9 months of storage without spoilage and deterioration in quality parameters.

INTRODUCTION

A large variety of products of pasty and semi liquid consistency, prepared out of various ingredients like fruits, vegetables and condiments of divergent quality and composition are popular under the name of "Chutney" in Indian households. A good chutney, whatever its ingredients may be, should have a palatable and appetising flavour and taste. Chutneys of various kinds are prepared in Indian homes and also on a commercial scale. There are many varieties of chutney manufactured in the country. Names of some varieties are sweet chutney, hot chutney, major gray chutney, colonel skinner's chutney and Bengal Club chutney

Chutneys are made from various fruits and vegetables like mango, apple, apricot, plum, (Lal et al., 1986). Chutney is one of the better known products of its kind in our country. Around 5,376

MT of chutney and pastes worth Rs. 160 lakhs were exported from India during 1996-97 (Anonymous, 1996). Chakraborty and Bhatia (1965) and Bhasin and Bhatia (1981) extensively reviewed the work in the field of technology of chutneys, pickle and sauce, which covered the aspects regarding raw materials, quality control, bringing, physico-chemical parameters, colour, flavour, texture and taste, etc.

Keeping above in view, attempts were made to standardize a recipe for preparation of sweet papaya chutney.

MATERIALS AND METHODS

Unripe, mature green papaya fruits were used for the preparation of sweet papaya chutney. The fruits were thoroughly cleaned, washed in water and air dried. Their pulp on analysis had a TSS-8.3%, acidity-0.09%, Vitamin C-53.2 mg/ 100g, moisture 88.6%, reducing sugars 1.4% and total

sugar 12%.

The fruits were peeled without leaving any green portion of the peel (skin) and shredded with the help of shredder (*kaddukas*). The prepared shreds were distributed in 12 lots and salt, red chilli powder and *garam masala* alongwith constant dose of other ingredients (except raisin and glacial acetic acid), were added as per the treatment details given in Table 1.

For the preparation of mango chutney, Singh and Lal (1943) used equal amounts of fruit and sugar and in jack fruit, Bhatia et al (1955) used 1/3 of its weight of sugar. Since papaya fruit contains nearly 12% sugar, it was enough to add 3/4 of its weight of sugar. Since the fruit is not acidic, 0.8% glacial acetic acid was also added on the basis of the weight of papaya shreds.

After mixing thoroughly with large spoon, it was transferred into stainless steel utensil and cooked

with occasional stirring until the mass attained the consistency of jam. At this stage, the product had a TSS of about 68-70%. This stage was considered proper for repeatable taste and for better storage. At the end, *kismis* and glacial acetic acid were added to it. The hot product was filled into previously sterilised hot and dry glass jars. All the samples were stored in a cool and dry place at ambient temperature ($30 \pm 5^\circ\text{C}$). Observation on quality of the product in terms of physical attributes like colour, flavour, texture and taste were adjudged by a panel of 5 experienced judges at a regular interval of 3 months i.e. at 0, 3, 6 and 9 months storage. The scoring was done on 9 point hedonic scale (Amerine *et al.*, 1965).

The sweet papaya chutney samples were analysed for different parameters like moisture, TSS, acidity, ascorbic acid and reducing sugars as per AOAC (1984) methods. Total soluble solids were determined by a hand refractometer. Titrable acidity was determined by titration of the aliquot against N/10 NaOH solution. Ascorbic acid was estimated by titrating the aliquot against 2,6-dichlorophenol indophenol solution. Reducing sugars content was determined by Folin Wu method as described in AOAC (1984). Moisture was estimated by drying in oven at 60°C till attained a constant weight. The analyses were carried out at 0, 3, 6 and 9 months of storage.

RESULTS AND DISCUSSION

Among the various treatments,

T8 in which 5% salt, 0.8% red chilli powder, 1.5 per cent *garam masala* (spices), 75 per cent sugar, 2.5 per cent raisin (*kismis*), 5 per cent sliced dried dates and 0.8 per cent glacial acetic acid (based on the weight of papaya shreds) were used, was found to be most acceptable upto 9 months of storage. The mean score value for colour, flavour, texture and taste were of 7.1, 7.1, 7.4 and 7.4, respectively (Table 2). The quality of chutney improved with the advancement of storage period. No fungal growth was observed in any of the treatments at the end of storage period.

Data on the score of qualitative evaluation also revealed that T8 scored the highest (7.60) on Hedonic scale as far as colour of the product was concerned after 9 months of storage. It was significantly superior to the other treatments but the storage period did not show significant difference. Highest scores were obtained in case of flavour, texture and taste (7.8, 8.20 and 8.0 respectively) in this treatment after 9 months of storage.

In the treatment T8, all the qualitative characters of the product progressively improved with the increase in the storage period. It is seen from the data (Table 3) that the moisture percentage decreased with the length of storage period. The moisture content in T8 was less (36.22%) than the treatments from T1 to T7 but more than T9 to T12. However, the moisture content in the chutney after 9 months storage was the least

(34.13%) as compared to other periods of storage. Similar results were observed by Sastry *et al.* (1975) during the ageing of mango pickle and Narayana and Maini (1996) in sweet pickle of turnip. The TSS content in T8 is more (65.59%) than majority of the treatments. Similarly, highest TSS (65.21%) was recorded at 9 months storage period which was significantly more than other storage periods. The gradual loss in moisture might have resulted in increased concentration of total soluble solids (TSS).

Acidity as citric acid was the lowest (0.38%) in T8. Similarly, the lowest acidity (0.33%) was recorded in the product after 9 months of storage. The decrease in acidity may be due to leaching from the papaya chutney (shreds) into the slurry. Similar results were observed by Kalra and Tandon (1983) and Pruthi and Bedekar (1963) during the storage of salted mango slices. Breakdown of organic acids during storage may be one of the reasons for this decrease in acidity.

The interaction between treatments and storage period with respect to acidity were found significant which altogether reduced the acidity in the prepared chutney.

The ascorbic acid content of T8 treatment was more than majority of other treatments. However, storage period progressively decreased the ascorbic acid which declined from 30.4 mg/100 g at zero period to 3.06 mg/100g at 9 months storage. It may be due to oxidation of ascorbic acid

to dehydroascorbic acid. The fact of declining ascorbic acid during storage period is similar to the observation of other workers in case of storage of turnip pickle (Bhasin and Bhatia, 1981).

Reducing sugars increased with the advancement of storage period which reached from 7.28% at zero period to 9.08% at 9 months storage. The increase in reducing sugars during storage period may be due to gradual loss of moisture and hydrolysis of starch into sugars.

The treatment comprising of papaya shreds 1 kg, sugar 0.75 kg, salt 50g, *garam masala* 15g, red chilli powder 8 g, raising 25g, sliced dates 50g and glacial acetic acid 8 ml was found to be the best with respect to quality parameters of the product without any deterioration in quality parameters.

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Table 1

S. No.	Treatments (g)	Papaya shreds	Salt (g) powder (g)	Red chilli (g)	Garam masala	Sugar (g) (g)	Raisin (g) acid (ml)	Sliced dates	Glacial acetic
1	T1	1000	40	8	10	750	25	50	8
2	T2	1000	40	8	15	750	25	50	8
3	T3	1000	40	9	10	750	25	50	8
4	T4	1000	40	9	15	750	25	50	8
5	T5	1000	40	10	10	750	25	50	8
6	T6	1000	40	10	15	750	25	50	8
7	T7	1000	50	8	10	750	25	50	8
8	T8	1000	50	8	15	750	25	50	8
9	T9	1000	50	9	10	750	25	50	8
10	T10	1000	50	9	15	750	25	50	8
11	T11	1000	50	10	10	750	25	50	8
12	T12	1000	50	10	15	750	25	50	8

Table 2: Qualitative characters of sweet papaya chutney under different storage periods

Months of storage	Treatments												Mean
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
Colour													
0	6.20	6.20	6.60	6.20	6.60	6.00	7.00	7.00	7.20	6.60	6.40	6.20	6.52
3	6.80	6.60	6.80	6.20	6.40	6.40	6.60	6.60	6.80	6.80	7.00	7.40	6.70
6	5.80	6.00	5.80	6.00	6.80	6.20	6.80	7.20	7.00	6.60	6.60	6.40	6.43
9	5.80	6.20	6.00	6.60	6.60	6.80	6.60	7.60	7.00	7.00	6.60	6.60	6.62
Mean	6.15	6.25	6.30	6.25	6.60	6.35	6.75	7.10	7.00	6.75	6.65	6.65	
C.D. at 5%													
Treatment									0.60				
Storage									NS				
Interaction									1.20				
Flavour													
0	6.20	6.00	6.20	6.00	6.20	6.20	6.80	6.80	7.20	6.60	6.00	6.40	6.38
3	7.00	6.60	7.00	6.40	6.80	6.60	6.60	6.20	6.20	6.80	7.00	6.80	6.70
6	5.40	5.40	6.00	5.60	6.00	6.20	6.20	7.20	6.80	6.40	6.40	6.40	6.17
9	5.80	5.60	6.40	6.60	6.60	6.40	6.40	7.80	6.80	6.60	7.20	6.80	6.58
Mean	6.10	5.90	6.40	6.15	6.40	6.35	6.50	7.10	6.75	6.60	6.65	6.60	
C.D. at 5%													
Treatment									0.56				
Storage									0.32				
Interaction									1.13				
Texture													
0	6.80	6.20	6.20	5.80	6.20	6.20	7.00	7.00	6.80	6.40	6.20	6.20	6.42
3	7.00	7.00	6.80	6.40	6.40	6.40	7.00	7.00	6.40	6.40	7.00	6.60	6.70
6	6.20	6.40	6.80	6.80	6.20	6.00	6.60	7.40	6.40	5.80	6.00	5.80	6.37
9	6.00	6.60	6.80	6.20	6.80	6.40	6.80	8.20	6.80	6.60	6.80	6.40	6.70
Mean	6.50	6.55	6.65	6.30	6.40	6.25	6.85	7.40	6.60	6.30	6.50	6.25	
C.D. at 5%													
Treatment									0.56				
Storage									0.32				
Interaction									1.13				
Taste													
0	6.40	5.80	5.80	6.40	6.00	6.20	7.00	6.60	7.20	6.40	5.80	5.80	6.28
3	6.80	7.00	7.00	6.40	6.80	6.80	7.40	7.80	6.80	6.40	7.00	7.00	6.93
6	5.80	6.20	6.40	6.80	7.20	6.40	7.00	7.80	6.80	6.40	7.00	7.00	6.93
9	6.80	6.60	6.00	6.80	6.60	6.20	6.20	8.00	7.40	6.60	6.60	6.20	6.67
Mean	6.45	6.40	6.30	6.60	6.65	6.40	6.90	7.50	7.10	6.50	6.35	6.35	6.30
C.D. at 5%													
Treatment									0.63				
Storage									0.36				
Interaction									1.25				

Table 3: Biochemical changes under different treatments and storage period.

(Months of Storage)	Treatments												Mean
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
%Moisture													
0	38.40	38.60	36.07	40.00	39.93	38.10	39.83	37.30	35.90	33.63	31.83	34.53	37.01
3	38.40	36.87	34.07	38.27	38.43	37.17	38.23	36.60	33.57	32.77	31.80	35.43	35.97
6	38.33	35.17	32.13	36.53	36.97	36.30	36.70	36.23	33.32	31.90	31.77	36.37	34.88
9	37.70	35.27	33.00	36.17	35.97	34.97	34.73	34.73	33.93	30.93	27.73	34.40	34.13
Mean	38.21	36.48	33.82	37.74	37.83	36.63	37.38	36.22	33.40	32.31	30.78	35.18	
C.D. at 5%													
Treatment										0.83			
Storage										0.48			
Interaction										1.67			
%T.S.S													
0	63.50	63.50	65.17	63.50	62.33	63.83	62.33	64.67	65.67	64.83	68.07	64.13	64.92
3	64.33	64.60	66.20	63.00	62.50	65.00	63.00	65.17	65.33	66.33	67.00	64.17	64.72
6	64.07	64.13	66.20	63.33	63.00	65.53	63.47	66.13	65.27	65.33	67.07	64.93	64.87
9	64.13	64.20	66.27	63.47	63.87	65.67	63.67	66.40	65.40	66.80	67.67	65.00	65.21
Mean	64.01	64.11	65.96	63.33	63.93	65.01	63.99	65.59	65.42	65.83	67.45	64.56	
C.D. at 5%													
Treatment										0.03			
Storage										0.02			
interaction										0.07			
%Acidity as citric acid													
0	0.50	0.54	0.53	0.53	0.48	0.48	0.48	0.48	0.48	0.43	0.43	0.53	0.49
3	0.54	0.54	0.61	0.54	0.52	0.45	0.47	0.39	0.39	0.49	0.53	0.64	0.51
6	0.44	0.44	0.43	0.46	0.40	0.38	0.31	0.38	0.45	0.47	0.45	0.47	0.42
9	0.35	0.36	0.35	0.36	0.26	0.36	0.36	0.38	0.45	0.45	0.38	0.35	0.33
Mean	0.46	0.47	0.48	0.47	0.42	0.42	0.40	0.38	0.39	0.41	0.45	0.50	
C.D. at 5%													
Treatment										0.03			
Storage										0.02			
Interaction										0.07			
Ascorbic acid (mg/100g)													
0	24.03	28.83	27.80	27.10	34.67	35.73	26.77	28.80	27.80	35.33	36.73	31.23	30.40
3	14.73	14.73	14.73	15.80	19.00	16.87	12.60	19.00	15.80	14.73	19.00	13.67	15.89
6	4.27	5.30	6.37	6.37	6.37	6.37	7.47	6.37	6.37	6.37	5.30	6.37	6.11
9	3.40	3.50	3.00	2.90	3.00	2.90	2.90	3.20	2.90	3.27	3.20	2.60	3.06
Mean	11.61	13.09	12.98	13.04	15.76	15.47	12.43	14.34	13.22	14.93	16.06	13.47	
C.D.at 5%													
Treatmet										0.89			
Storage										0.51			
Interaction										1.79			
%Reducing sugars													
0	7.30	7.17	7.63	6.87	7.37	6.83	7.47	7.80	7.87	7.23	7.10	6.67	7.28
3	8.17	8.07	8.50	8.53	8.50	8.43	8.27	8.50	8.20	8.20	8.37	8.53	8.36
6	8.10	7.67	8.10	8.00	7.83	7.77	8.10	7.73	8.20	8.50	8.30	8.30	8.08
9	9.03	8.70	9.20	9.10	8.93	8.86	9.10	8.83	9.20	9.40	9.30	9.40	9.08
Mean	8.15	7.90	8.36	8.13	8.16	7.98	8.23	8.33	8.37	8.33	8.27	8.23	
C.D.at 5%													
Treatmet										0.03			
Storage										0.02			
Interaction										0.07			

REVIEW ARTICLES

PRE-AND POST-HARVEST FACTORS INFLUENCING THE SHELF LIFE OF *BER* (*ZIZYPHUS MAURITIANA LAMK*) - A REVIEW

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ABSTRACT

Post-harvest quality and shelf life of *Ber* (*Zizyphus mauritiana Lamk*) fruits are largely influenced by both pre-and post-harvest factors. Pruning, control of fruit drop by exogenous application of plant growth regulators, stage of maturity and physico-chemical composition of fruits at the time of harvest have been identified as important preharvest factors, while use of plant growth regulators, irradiation and storage conditions are important post-harvest factors that significantly influence the shelf life and quality of *ber* fruits. Development of skin colour of the fruit, total soluble solids and polyphenol oxidase activity could be used as most promising maturity indices for fruit maturity. Storage studies revealed that the shelf life of wax coated ripe fruits packed in polyethylene bags and stored at 0-3.3°C and 0 - 4°C, could be extended upto 30 to 40 days and 21 days respectively as compared to 7 days of untreated ripe fruits stored at 30 to 35°C. Such *ber* fruits could be transported to short and long distance domestic markets from North India to South India.

INTRODUCTION

Ber (*Zizyphus mauritiana Lamk*) is one of the important minor fruits and the most ancient fruit of India. It is being considered as poor man's apple due to low cost of production. It is ideally suited for growing in the arid and semiarid regions of India, particularly in waste and marginal lands. It is mainly grown in the states of Madhya Pradesh, Bihar, Uttar Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra and Andhra Pradesh. *Ber* production has increased many folds in recent years mainly due to availability of a wide range of high yielding and early bearing cultivars

suitable to specific regions of India.

Nutritionally, *ber* fruit is widely acclaimed for its rich source of ascorbic acid. Apart from this, it is a good source of essential minerals and carbohydrates (Pareek, 1983). As *ber* fruit has a delicious taste and eaten as fresh, it has a fairly good market in Central and Northern India (Ken Anthony et al., 1993). Extensive studies have been carried out to prepare various processed products from *ber* fruit, such as candy, preserve, dehydrated products including osmo-dehydrated products, jam, jelly and juice (Khurdiya and Singh, 1975; Gupta et al., 1980; Gupta et al.,

1981a, 1981b; Khurdiya 1980a, 1980b; Anon, 1990 and Gupta 1983).

Ber fruits have a short shelf life of 4-5 days at ambient conditions due to their perishable nature. Hence transportation of these fruits to distant places is difficult and results in heavy postharvest losses. The skin colour of such fruits changes from yellow to brown when kept at ambient temperature of 25-30°C (Gupta and Kadam, 1995). Identification of pre-and postharvest factors influencing the storage life and quality of *ber* and their proper management are important to

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minimise the postharvest losses and improve keeping quality.

In the present review, an attempt has been made to critically appraise the current status of scientific and technological developments and advances made in better understanding of the physiology and biochemistry of flowering, fruit setting and fruit development, pre-harvest factors including endogenous plant hormonal status, pruning, maturation changes, exogenous application of plant growth regulators and the postharvest factors such as handling, packaging, transport and storage conditions influencing the shelf life and quality of *ber*. This information will be useful to plan strategies for future R and D activities on *ber* fruits to establish a sound base for increased production and its availability both for domestic use and export trade on a strong scientific and technological foundation.

Influence of Preharvest factors

Pre-and postharvest management practices determine the quality and shelflife of fruits. Detailed studies on the effect of various pre-harvest factors on post-harvest quality and storage life of *ber* fruits have been reported which are enumerated below.

Effect of pruning on fruit production and its quality : Pruning operation in *ber* is considered as one of the regular practices for the production and maintenance of regular fruit bearing, both qualitatively and quantitatively. As *ber* fruits are born in the leaf axiles on the young growing shoots of current season, a regular annual pruning is very much essential to induce healthy plant

growth and to enhance fruit bearing. Pruning in the form of thinning of branches is also necessary to avoid overcrowding of branches, which helps in reducing the incidence of pests and diseases during fruit development stages till harvest. The best time for pruning a *ber* tree is during the hot and dry season or when it sheds its leaves and becomes dormant after the harvesting of fruits (Sharma and Kore, 1990). Pruning operation consists of removal of dead and diseased wood, criss-cross branches and weak crotches. Severe pruning should be avoided since it adversely affects the growth of plant and gives poor fruit quality and yield. The effects of severity of pruning on flowering, fruit settings, fruit yield and quality of *ber* fruits in different cultivars at different agroclimatic growing regions have been investigated (Bajwa et al. 1986; Bisla et al. 1991 and Kundu et al. 1994).

Kundu et al (1994) observed that 13 year old *ber* tree (cv. *Umran*) pruned to 150 buds per primary branch during hot and dry season had recorded maximum shoot length, leaf area, bud sprouting, fruit set and effectively controlled fruit drop by maximum retention of fruits. Studies conducted on severity of pruning and planting distance on flowering, fruit set and fruit retention of 13 year old *ber* tree (cv. *Umran*) revealed that flowering, fruit set and fruit retention were delayed with pruning severity and decreasing planting distance, while the percentage of fruit set increased with severity of pruning and wider planting. The percentage of fruit retention increased with increasing planting distance and decreasing pruning severity. Medium

pruning combined with a planting distance (7.2m x 7.2 or 9.6 x 9.6m) was most appropriate for *ber* tree (Yadhav and Godara 1992). Similarly, effect of pruning and the extent to which *ber* trees (cv. *Umran*) should be pruned was reported by several workers (Gupta and Singh, 1977; Sharma et al. 1980; Sandhu et al, 1983 and Bisla et al, 1991). Bajwa et al. (1986) opined that pruning treatments in *Sanaur-5* cultivar of *ber* considerably decreased the number of shoots and appreciably improved fruit quality but only light pruning had significantly increased the fruit set, fruit retention and fruit yield as compared to medium and heavy pruning. Although the fruit yield in unpruned trees was maximum, fruit quality was poor, while heavily pruned trees produced big size, quality fruits with significantly higher fruit weight.

Effect of artificially induced light on fruit maturity and quality : In late maturing varieties of *ber*, both flowering and fruiting are delayed and stretches for a long period. Such *ber* varieties require more number of light hours to initiate early flowering and subsequently early fruiting. Chiou Chu Ying and Huang Mingtech (1994) conducted studies on effect of artificially induced light on Indian jujube trees at flowering stage during night hours continuously for 15, 30 and 45 days. It was observed that artificially induced light treatments for 30 and 45 days had significantly reduced fruit maturity period by 40 and 60 days respectively as compared to controlled trees, without affecting the fruit size and quality.

Pre-harvest application of plant

growth regulators : Application of plant growth regulators before harvesting has been practiced with specific objectives and purposes. Some of the merits of preharvest use of growth regulators are : a) to enhance fruit bearing of *ber* trees every year, b) to reduce the extent of fruit droppings in specific cultivars, c) to hasten or to delay the fruit maturity which in turn helps in altering the harvest time and ripening period, d) to reduce spoilages during pre-harvest and storage periods and e) to improve the physico-chemical characteristics of fruits. Generally, *ber* fruits on the tree do not ripen simultaneously as it requires 4-5 pickings and may extend to 6-7 pickings for late maturing varieties such as *Umran* which results in higher labor costs for picking. The cumbersome picking operation and high labour costs could be markedly reduced by using suitable plant growth regulators. Therefore, use of plant growth regulators in *ber* often helps to overcome these limitations and ensures early market returns by induction or early and uniform ripening of fruits. Pre-harvest foliar spraying of ethephon at 400 and 500ppm to *Umran* Var of *Ber* accelerated maturity of fruit which turned to deep golden yellow colour with the highest TSS, ascorbic acid and total sugars, and with lowest specific gravity and acidity. Further, such fruits become more palatable and could be ripened two weeks earlier than untreated ones. Early ripened *ber* fruits could fetch higher price in the market. Also the harvesting period could be stretched from two weeks to one month and would ease the strain of marketing at peak ripening time. Similarly,

application of calcium compounds (such as calcium chloride and calcium nitrate) at 1.7g/litre as pre-harvest spray, reduced fruit weight loss, delayed colour development and maintained good quality *ber* fruits during storage period (Gupta et al. 1987). Banker and Prasad (1990) reported the pre-harvest spraying of GA3 (Gibberellic acid) and NAA (Naphthalein acetic acid) (at 10,20,30 ppm) alone or in combination, both at flowering and 15 days after flowering, increased fruit set and fruit retention. Also the fruit weight and fruit length were significantly increased by GA3 or NAA at 30ppm concentration and TSS content was improved by GA3 treatments. Masalkar and Wavhal (1991) reported that pre-harvest application of GA3 (10-20ppm) and ethephon (400ppm) to *ber* trees (cv. *Umran*) improved the physico-chemical characteristics of *ber* fruits. Significant increase in fruit weight, fruit volume, pulp percentage, non reducing sugars and ascorbic acid contents and lowest stone percentage were obtained with GA3 treatments alone, while ethephon treatment resulted in highest TSS content and also improved the fruit colour to golden yellow. Bal et al. (1995) reported that pre-harvest spray of ethephon at 300 ppm to *ber* tree induced uniform ripening of fruits and the fruits harvested at optimum maturity could be stored for upto 40 days at 0-3.3°C and 85-90% RH.

Physiology of Fruit growth, development and fruit maturation

Physical changes : *Ber* requires relatively long period of 150-190 days (22-27 weeks) after fruit set for fruit growth and maturation. The entire

fruit growth can be divided into three distinct phases viz., the most active fruit growth phase occurs during the first 6-7 weeks and the last 8-10 weeks. During the middle 8 weeks, growth is very slow and continues upto harvest (Teaotia and Chauhan, 1974). Meel et al. (1991) observed that *ber* cultivars grown in Hissar region of North India can be harvested at 120 days after fruit set.

Studies on the developmental physiology of fruit of the *Umran* cultivar in Punjab indicated distinct physical and chemical changes during growth and development of fruit.

Fruits attain ripe stage in 190 days after fruit set. Fruit growth in terms of length and diameter showed three distinct phases. Increase in length was faster than in diameter during first phase and subsequently in the third phase, fruit growth increased in diameter than in length. This difference could be due to climate and variety. Thus, the fruit grows in length and then followed by increase in its diameter (Bal and Singh, 1978a). Godge and Kale (1991) conducted similar studies in *Mehrun* cultivar of *ber* and found that fruits attain maturity at 110 days after anthesis. Fruit growth in terms of length, diameter, weight and its volume increased from fruit set to maturity, while specific gravity decreased. Abbas et al. (1994) noted a distinct double sigmoid curve pattern of fruit growth in *Bawidawi* and *Mallacy* cultivars (*Zizyphus spina-christa*) and reported that stone development proceeded at a faster rate upto 105 days. Specific gravity of fruit was low initially, then increased upto 105 days from fruit set and thereafter

decreased as the fruits advanced towards maturity. Fruit weight continued to increase from fruit set till maturity.

Changes in chemical constituents :

The major chemical change observed during fruit development in *Umran ber* cultivar was in TSS which continued to increase from fruit set to ripening. The increase was very much pronounced at later stage of maturity. There was a corresponding decrease in acid content of the fruits and pH value of the fruit pulp increasing gradually with ripening of the fruit. At physiological maturity, fruit colour turns to dark green followed by ripening with change in colour as the ripening process advances. Stalk end of the fruit starts yellowing, later turns to bright yellow and subsequently it turns to brown at fag end of the ripening. Wide variation in TSS (12.2-19.2°Brix) and acidity (0.23-0.52%) in different cultivars of ripe fruit was reported (Teaotia et al., 1974). Reducing sugars increased marginally with advancement of maturity and the increase was comparatively rapid at last picking. Starch content in the fruits increased upto 45 days of fruit set and thereafter declined till the ripe stage.

Changes in chemical constituents such as total phenolics, ascorbic acid and minerals during *ber* fruit development were also reported (Bal and Singh, 1978b). Ascorbic acid content gradually increased during growth and development (15 days after fruit set) upto 190 days. Total phenolics content increased initially and reached peak in developing fruits and later showed a fall as the fruit

maturity advanced. Calcium content showed a gradual downward trend upto 150 days and then remained constant till ripening. Phosphorous content showed a steady decline with advancement of maturity. Iron content remained almost constant in the beginning and thereafter gradually decreased towards ripening.

Several studies on changes in chemical constituents during fruit growth revealed that there was increasing trend in TSS, total carotenoids, ascorbic acid and reducing, non-reducing and total sugar contents after fruit set until fruit maturity but total chlorophyll, total phenolics, acidity and moisture contents decreased towards maturity (Godge and Kale, 1991; Abbas et al., 1994). Ascorbic acid increased rapidly during early stages of fruit ripening but declined towards the end. Specific gravity of the fruit decreased from 1.1 to 0.99 TSS and ascorbic acid increased, while titratable acidity decreased with the advancement of maturity (Gupta and Kadam, 1995).

FRUIT DROP AND ITS CONTROL MEASURES :

Fruit drop is a major and serious problem in *ber* production. Initially the extent of fruit set is very high but extent of fruit retention chiefly depends on the level of production of endogenous plant hormones and the cultivar type. Sharma et al. (1990) conducted fruit drop studies in six cultivars of equal age (8 years old) and found that early matured cultivars were resistant to fruit drop, while late cultivars were the most susceptible to fruit drop as they had the lowest fruit retention. Similarly, Grewal et al. (1993) observed cultivar differences

in fruit drop and investigated that fruit drop was highest in cultivars, *Sandhura* and *Narnaul* and on spraying with 10 ppm of NOXA growth regulator after fruit set, fruit drop in these cultivars was effectively controlled which resulted in production of large size fruits with significant improvement in quality attributes such as with higher TSS and ascorbic acid contents and lower acidity, total sugars and reducing sugar contents than most other treatments.

Also, foliar application of micro-nutrients such as FeSO_4 (0.4%), SnSO_4 (0.4%) and Boric acid (0.2%) in *Karaka* cultivar during August - September had significantly increased the number of flowers per shoot, extent of fruit set, fruit set, fruit retention, fruit yield, fruit weight and effected control of fruit drop (Kamble et al. 1994). Studies on impact of changes in the pools of endohormones (GA3, IAA, Cytokinin, Absciscic acid) and soluble sugars during flowering and fruit setting in Chinese jujube revealed that the last stage of flowering (Stigma withering) was the critical period for fruit set, during which the levels of endohormones (IAA and ABA) were main causative factors affecting the fruit set and subsequent fruit drop. High levels of soluble sugars would help in reducing the physiological fruit drop but it had no correlation with fruit set. However, the exogenous application of GA3 not only increased fruit set percentage but it also increased the capacity of the ovary and flower to act as physiological sinks thereby reducing the physiological fruit drop (Biping et al 1996).

FRUIT CRACKING AS DEVELOPMENTAL DISORDER IN *BER*

Considerable reduction in yield and quality of *ber* fruits occur due to preharvest physiological disorders like fruit cracking, fruit skin discoloration and fruit drop. These disorders pose serious problems in the fruit development. Preliminary studies on the mechanism of fruit cracking in three cultivars of Chinese jujube indicated that fruit cracking begins at the white ripe stage and susceptibility to cracking increases with maturity, which appears to be due to accumulation of soluble sugars and decrease in water potential and peel toughness. *Huping Zao* was the most susceptible cultivar followed by *Heiye Zao* and *Lang Zao*. Further studies revealed that all cultivars were susceptible to fruit cracking and the elasticity and plasticity nature of the fruit flesh was the main cause for fruit cracking (Li and Gao 1990).

FRUIT HARVEST MATURITY INDICES FOR HARVEST

Maturation time for *ber* fruits varies with genotype and environment. Teatota and Chauhan (1974) reported that *ber* fruits require about 22 weeks from fruit set to maturity. Meel et al. (1991) reported that *ber* cultivars grown in Hissar region of North India could be harvested 120 days after fruit set. Harvesting the fruits at appropriate maturity is vital for improving the shelf-life and quality of the fruits as suggested by Gupta and Kadam (1995).

Days after fruit set, number of growing degree days from full bloom,

development of fruit skin colour, changes in chemical constituents, polyphenol oxidase activity and the specific gravity of the fruit during fruit development have been recommended as the important criteria for assessing the optimum fruit maturity by various research works (Siddiqui and Gupta 1989; Meel et al. 1991; Al-Niami et al. 1992; Kadam et al. 1993; Gupta and Kadam, 1995).

The development of fruit skin colour is one of the most dependable and reliable maturity indices. *Ber* fruits of *Umran* cultivar harvested at different stages of maturity characterized by distinct skin colours which could be used as better index of the maturity stages, such as green at physiological maturity, slight yellow, half yellow and full yellow (during ripening) and brown at the fag end of the ripening stage. Generally, fruits harvested at half yellow to full yellow stage for marketing purpose have a short shelf life of 4-5 days only. Siddiqui and Gupta (1989) have determined the maturity standards of 3 cultivars of *ber* fruits (*Umran*, *Gola* and *Kaithali*) by harvesting fruits at green mature, greenish yellow and full yellow coloured stages. They observed that trend in specific gravity differed with each variety, fruits of *Kaithali* could be harvested at greenish yellow stage for transportation owing to its high wall pressure, while *Gola* fruits could be harvested at any stage for storage purpose because of its low ethylene evolution rate. Al-Niam et al. (1992) reported that fruits of cultivars, *Mallacy* and *Bambawi* harvested at the mature green stage attained optimum eating quality after 6-7 days as fruits

attained the climacteric peak with increased ethylene production and respiration rate. Several studies on specific gravity of the fruits during fruit development indicated that fruits could be harvested once they attain specific gravity equal to 1 and therefore, specific gravity is considered to be the reliable indicator to harvest (Meel et al. 1991; Kadam et al. 1993).

Studies on changes in trends of chemical constituents of *ber* fruits during developmental stages could be used as one of the promising indices of fruit maturity for harvesting. There was increase in the trend of TSS, sugars, carotenoids and ascorbic acid contents, while titrable acidity and total phenolics contents decreased with fruit maturity (Meel et al. 1991; Al-Niam et al. 1992). Kadam et al. (1993) reported that TSS and polyphenol oxidase activity could be used as the most promising indices for harvesting, for extending the shelf life and to find out the suitability of *ber* fruits for processing.

IMPACT OF PHYSICO-CHEMICAL COMPOSITION ON QUALITY AND SHELF LIFE OF FRUITS

The period for fruit development and maturation and subsequently the quality and shelf life of fresh fruits varies with the cultivar. The cultivars are known to influence the quality of the fruits by their specific physico-chemical properties. Hence, for post-harvest studies, varietal selection and its nutritional composition have to be considered as important traits which ultimately determine the shelf life and post-harvest quality of fruit. *Umran*, *Kathapal* and *Gola* are the important and most promising

varieties of *ber* in North India (Daulta and Chauhan, 1982).

Pareek and Vashistha (1983) reviewed the prominent *ber* cultivars of North India and grouped the cultivars such as *Umran*, *Chhuhara*, *Maharwali*, *Bagawadi*, *Kali*, *Lam*, *Tikadi*, *Gola*, *Jogia*, *Mundia* and *Nimaj* as most delicious *ber* varieties of Rajasthan. Important physico-chemical traits, harvesting season and suitability of the specific cultivars for short and long distance transport and the extent of shelf life of important varieties have been established.

Umran : This variety is commercially cultivated on a large scale in Punjab, Rajasthan and Haryana states of India and fetches highest price. It has large size fruits, oval in shape with a roundish apex with initially attractive golden yellow colour which later turns into chocolate brown colour at full maturity. Fruits ripen during mid March to mid-April. The fruit is sweet with 19% TSS and 0.12% acidity. It has pleasant flavour and excellent dessert quality. The average fruit weight ranges between 30-80g. It matures in the mid season to end of the season (Feb - March). Its fruits have good keeping quality and can withstand long transportation. It is known by many names such as *Katha*, *Ajmeri* and *Chameli*. The main reason for its popularity is due to its long shelf life (15-20 days) besides excellent organoleptic characters.

Chameli : The main reason for its popularity is due to its long shelf life (15-20 days) besides excellent organoleptic characters.

Kathapal : It is a late ripening variety having small to medium size fruits

with one side remaining greenish at fruit maturity whereas the other half side develops reddish yellow tinge. The average fruit weight is 10.0g with highest TSS (23%), with acidity towards higher side (0.77%).

Gola : It is an early-maturing cultivar grown in UP, Punjab, Haryana and Delhi and starts bearing in first week of January. Fruits are very attractive, roundish in shape and golden yellow in colour; its white, semi-soft and juicy flesh is very delicious. The fruits have average fruit weight of 20g, TSS 17-19%, acidity 0.46-0.51% and pulp : stone ratio of 14. The colour of the ripe fruit turns to golden yellow at full ripe stage.

Kaithali : It is mid season variety and ripens during March. Fruit is medium in size, oval in shape and has a tapering apex. Average fruit weight is 18.0g. with soft pulp having 18% TSS and 0.5% acidity. Unlike *Umran*, it does not withstand transportation stress and has poor keeping quality.

Tikadi : It has small size fruits with average fruit weight of about 10g. Fruits become edible with creamy soft flesh when skin turns to red colour in very short period (7-10 days of ripening process on the tree). The ripe fruit attains high TSS (25%), with large stone and with a pulp/stone ratio of 6.9. It is a late maturing variety and its fruits ripen during Feb-March.

Jogia : Its fruits attain light purple tinge at unripe stage and are edible. Because of this, it has an advantage of extended harvest period up to early February. Skin surface has coarse ridges and is greenish yellow in colour. The flesh is white, soft, juicy and

sweet with TSS of 19% and with pulp/stone ratio of 14.

Mundia : It is an early, high yielding cultivar with juicy, bell shaped large size fruits, It attains maturity during mid January. The fruit weighs about 40g and has yellowish green skin surface with smooth depressions. The flesh is white and soft, with 20% TSS and pulp/stone ratio of 23.

Several studies were conducted on evaluation of *ber* cultivars for changes in physico-chemical and organoleptic characteristics and their influence on storage life (Yu et al., 1991; Wang et al., 1992; Chovatia et al., 1992; Sanjev Kumar et al., 1992; Wan, 1994; Renxiaolin et al., 1995; Neeraj et al., 1996). Tripathi et al (1989) found that the cultivar *Karaka* recorded maximum fruit weight (17.43g/fruit), specific gravity (1.08) and non-reducing sugars (8.45%), while *Badshah Pasand* recorded the maximum amount of TSS (18° Brix), protein (0.22mg/g) and acidity (8.41mg/g). Ascorbic acid (48.6mg/100g), reducing sugars (9.81%) and total sugars (12.93%) were highest in the fruit pulp of *Jogia* variety. Kunda et al. (1989) reported that the cultivar (*Haq Nawaz*) with high sugars (11.52%) and very low moisture content (78.5%) had long shelf life (15-20 days). Neeraja et al (1996) observed that the fruit quality of *ber* cultivars (*Gola*, *Umran* and *Seb*) grown in South India was comparable with that of those grown in North India. Hence, these *ber* cultivars grown in South India could be transported to North India even in October when the *ber* trees begin to flower in North India.

POSTHARVEST APPLICATION OF PLANT GROWTH REGULATORS

Plant growth regulators are applied after harvest with multipurpose objectives such as to hasten uniform ripening of fruits, to reduce the post-harvest decay losses of fruits, to improve the physico-chemical characteristics of fruits, to improve the shelf life and keeping quality and finally to increase the marketability of fruits for longer period.

Ethephon has been found most effective plant growth regulator in accelerating the ripening and improving fruit quality (Bal and Chauhan, 1981; Bal et al. 1992; Bal et al. 1996). It was reported that post-harvest dipping of *ber* fruits in 500ppm of ethephon, had significantly increased the TSS and ascorbic acid contents and hastened the fruit ripening by 6 days (Abbas et al. 1994). Siddiqui and Gupta (1995) found that the post-harvest dipping of *ber* fruits (cv. *Umran*) at colour turning stage with cycocel or chloromequot (500 or 1000 ppm) for 15 minutes and subsequent storage of such fruits (packed in wooden boxes with newspaper) at $25 \pm 5^\circ\text{C}$ significantly reduced the decay loss of fruits and effectively retarded the ripening process thereby extending the shelf-life of fruits.

Studies on post-harvest dipping of fresh *ber* fruits of cultivars *Gola* and *Umran* in 200 ppm of maleic hydrazide and waxol (3 or 6%) respectively increased the marketability percentage and improved the storage life and keeping

quality of ripe *ber* fruits for upto 12 days (Naik and Rokhade 1994; Bandyopadhyay and Sen 1995). Post-harvest dipping of fruit of *Gola* cultivar in 1000ppm of KMnO_4 at colour turning stage gave the best result of extending the shelf-life of fruits to 14 days at room temperature (Ramkrishnan and Godara, 1994). Similarly, Sandhar and Desai (1991) reported that fruits of *Umran* cultivar harvested at the golden yellow colour stage and dipped in 10 ppm of benzyl adenine for five minutes and packed in polyethylene bags, had lowest weight loss, highest TSS, sugars, vitamin C and palatability rating after 8 days of storage.

EFFECT OF POSTHARVEST IRRADIATION ON SHELF LIFE AND QUALITY OF *BER* FRUITS

Radiation preservation of *ber* fruits is one of the post-harvest strategies which may help in delaying the post-harvest ripening and senescence, in reducing the post-harvest spoilages and also in extending the shelf life of these fruits. Studies conducted on use of irradiation to achieve these objectives have been reported to be encouraging in some of the minor fruits such as *ber*, fig and dates (Paul Thomas, 1988). Ahme et al (1972) treated mature, hard green *ber* fruits of cultivar *Umran*-13 with 10, 20, 30, 40 and 50 Krad of gamma rays and found that fruits treated with 20-40 Krad doses were relatively firmer and greener than controls during 8 days of storage at room temperature ($30 \pm 2^\circ\text{C}$). Irradiation had no detectable adverse effect on taste and flavour of the ripened fruits. Similarly, no significant changes in TSS,

titratable acid, sugars, ascorbic acid, pectic substances, carotenoids and chlorophyll of the ripe *ber* fruits occurred as a result of post-harvest irradiation of *ber* fruits.

EFFECT OF PACKAGING ON SHELF LIFE AND QUALITY OF *BER*

Packaging of freshly harvested *ber* fruits is most important for safe transport of the fruits during transportation and storage conditions. Thus, an ideal fruit package ensures complete protection to the fruit contents from spoilages and physical damages. Pareek and Gupta (1988) suggested various types of containers for packaging of *ber* fruits depending upon the bulk of the fruits. Comparative studies on gunny bags, wooden crates, bamboo baskets and hard board corrugated cartons for packaging fruits of *Kaithali* and *Umran ber* cultivars revealed that hard board corrugated cartons of 40cmx25cmx20cm size, with 6 holes of 1cm diameter on two sides, paper cuttings as cushion and fruit holding capacity of 8-9 Kg, retained good quality of *ber* fruits for 9-12 days (Gupta et al, 1981a). Decay and weight losses could be reduced by use of 5g bleaching powder/kg fruit package as a fumigant (Singh and Gupta, 1987) and diphenyl impregnated paper lining (Siddiqui and Gupta, 1988). Packing in bamboo baskets with dry grass as cushioning material was most suitable for local or short distance transport (Pareek and Gupta 1988). Panwar (1981) reported that perforated polyethylene bags could be used for sale of *ber* fruits in the local markets.

EFFECT OF STORAGE CONDITIONS ON SHELF LIFE AND QUALITY OF *BER* FRUITS

The shelf life and quality attributes of fresh *ber* fruits are largely influenced by the storage conditions apart from the right stage of fruit maturity. The shelf life of *Umran* and *Sanaur* fruits could be enhanced to 30 and 40 days respectively in the commercial cold storage (0-3.3°C) when treated with wax emulsion and packed in polythene bags (Yamdagni, 1985). Also, Pareek and Gupta (1988) observed that the shelf life of *Gola* and *Kaithali* cultivars of *ber* at 1.7°C improved to 42 and 28 days respectively as against 7-10 days under ambient storage. The golden yellow coloured ripe fruits of *Umran* after sorting and grading with the removal of undersized, overripe and damaged fruits, were properly packed in bundles or baskets of convenient size. Such fruits could be stored for about a week at room temperature (30-35°C) and for about 3 weeks at low temperature ranging from 0-4°C (Anon, 1990). Gupta and Kadam (1995) reported that *ber* fruits stored at ambient temperature had short shelf life of 3 days only. Kadam et al., (1995) suggested that precooling improved the shelf life of *ber* fruits and significantly reduced the loss in fruit weight in precooled fruits stored at 4°C for 8 days. During storage of *ber* fruits, the TSS and reducing sugars increased upto 6 days and decreased thereafter.

CONCLUSION

As an important minor fruit, *ber* has immense scope for cultivation in arid and semiarid regions of India particularly well suited for waste

lands, inferior and marginal lands at comparatively low production costs, which ensures better returns. There is considerable demand for fresh *ber* fruits in the local and long distance domestic markets in India. However due to its short shelf-life of 3-4 days and poor keeping quality its marketability is constrained. With the aid of present knowledge in the areas of pre-and postharvest management factors and practices, the shelf life of *ber* fruits could be improved to 30-40 days. By proper manipulation of these pre-and postharvest factors *ber* fruits could be transported to even long distance markets. Work needs to be undertaken on improved systems of packaging, handling and transportation to further extend the shelf life and improve the keeping quality of the promising *ber* cultivars. Modified atmosphere packaging coupled with active packaging of the individual promising *ber* cultivar, may be explored to further improve their keeping quality and shelf life for the benefit of the trade.

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GENERAL ARTICLES

Ministry of Food Processing Industries taking a Holistic Step for the Development of India's Cold Chain Infrastructure*

The theme of the conference is extremely important as the cold chain has been identified by several studies and long experience to be a critical element in the building up of a large viable and dynamic processed food industry in our country. India today is emerging as one of the major industrial nations of the world. India has passed through numerous problems in increasing production of food in the country and has successfully accomplished the increase in production level to meet the growing domestic and export demand. This has been possible only by making concerted efforts through the green revolution. These efforts had made India today more or less self sufficient in food production, milk production and now marine production. With a population of one billion people now, India provides the single largest market in the world.

India is the largest producer of fruits and milk and second largest producer of vegetables. It is estimated that almost 25 to 30% of fruits and vegetables are estimated to be spoilt at the post-harvest stages due to poor storage and transportation, and the inadequacy of marketing set up. India wastes more fruits and vegetables than are consumed in a country like UK. CII-Mckinsey report on modernisation of India's fruit chains estimates that the inefficiency results in substantial wastage of the raw material which could be processed and made available to the vulnerable sections of the society and could thus provide the desired levels of utilisation of agricultural production. It has been estimated that every one percent of reduction in wastage levels of only fruits and vegetables would translate into savings of Rs. 1200 crore and if India wide yields were brought up to the world's average, production of processed foods would increase by 30 to 40%.

The quality of processed food products depended not only on the quality of the primary agriculture

produce processed but also on their post harvest handling. By developing suitable post harvest handling techniques of which those involving cold chains are important ones, the shelf life of the produce can be increased and deterioration of its quality checked.

As most agricultural produce has seasonal availability proper preservation and storage facilities needs to be established at the farm level itself. This will ensure availability of the agricultural produce throughout the year for direct consumption as well as processing and will also reduce their wastage. Today, most of our food processing plants are under utilised due to seasonal availability of raw material. For example the percentage utilisation of the fruit and vegetable processing capacity in the country is below 50% and it can be increased only by proper storage of raw materials during the production seasons.

Even today the total number of cold stores available is only about 3500. This involves a total cold store capacity of around 30 million cubic metres capable of storing 10 million tonnes of primary produce. But an analysis of that capacity shows that as much as around 90% of it has hitherto been utilised for the storage only potatoes. Fortunately there has been a shift in this trend in recent years and a number of multi product cold storages are now being set up for the storage of other horticulture produce as well as processed food products.

But we still have a long way to go in purely quantitative terms. More importantly we need to adopt a strategy whereby these facilities are provided collectively for a region as "cold store centres" with potential strength of storing primary and processed agriculture products for most of the year. If this is done such cold chain facilities will become economically viable both because of economics of scale and due to their operations for large portions of the

* Excerpts of keynote address made by Sh. P. S. Bhatnagar, Secretary, MOFPI, at the International Conference on developing India's cold chain infrastructure on Sept. 16, 1999, New Delhi. (Reprinted from *Agribusiness Report*, Sept - Oct '1999)

year. These centres would be so configured and set up as to service regions within area of around 5000 to 1000 hectares each. They would need to have basic facilities for precooling, cold storage, washing, grading, sorting and quality testing. Government has already initiated the steps to operationalise this idea. APEDA in association with my ministry has entered into an MoU with Agro Technological Research ATO DLO under the Ministry of Agriculture, Netherlands to undertake feasibility studies in respect of four states Maharashtra, Gujarat, Tamil Nadu and Jammu and Kashmir for establishment of supply chain for fruits and vegetables from the farm to the consumer.

On the distribution side, there is high demand for the frozen chilled processed food items in the global markets. Some food processing industries especially the sea food industries and the meat industries have progressed to some extent and have invested in modern facilities of international standards for frozen storage and refrigerated transport for catering to the international demand. On the domestic front the dairy industry has been able to establish a fairly good cold chain system for milk and milk products. But we still lack of an organised refrigerated distribution system. As a result, not much effort has been made for addressing the domestic markets for frozen sea food, meat products and other processed food products. Today it is only in some of the major cities that frozen vegetables like green peas, cauliflower and carrots are sold in individually packed form. In the case of mutton and buffalo meat products, it is only in recent years that a few modern units are being set up in various parts of the country for this purpose. We need to accord top priority to putting in place an efficient refrigerated distribution system to ensure availability to quality frozen products to the consumer throughout the year.

Modern cold chains involve a number of equipments such as pre-colling facilities, cold storage, humidity controlled and controlled atmosphere storage facilities and reefer containers. Our efforts to set up such chains have not been satisfactory. Moreover whatever cold chain infrastructure has been set up has tended to be dedicated to a particular product or to a particular processing unit. What we need is to develop an integrated cold chain infrastructure covering the major production areas, the processing units and the distribution centres which could be utilised by the farm sector as well as the processed food sector. This will call for a strong fleet of

refrigerated transport vehicles to be established to connect to the farm level storage facilities, the processing units and the various distribution outlets as the present system of transporting by insulated trucks is not effective for long distance movements.

At the retail outlet end there is a need to develop display cabinets for marketing of frozen food products. We also need to augment our cold chain facilities and container handling facilities at major ports as also at air cargo complex for targeting the global markets.

All these will not only need large scale investment but also the development of appropriate technologies most suited to our requirements. Though the cold chain technology is well developed in most of the highly industrilaised countries and many of the more advanced developing countries we need to set up own agenda for building up of our cold chain infrastructure keeping in view our climatic conditions, the character and quality of our electrical grid and our logistical problems.

Ministry of Food Processing Industries is taking a holistic approach towards the development of cold chain infrastructure and the major emphasis is on the integrated development as it is essential to have these facilities available from farm level to distribution centres. The plan schemes of the ministry provides financial assistance in the form of grant/loan to different organisations in public sector/joint sector/private sector and cooperative sector depending on the area of the activities.

The ministry has provided financial assistance to 56 units during the years 1992-93 to 1997-98 for setting up infrastructure facilities including cold storages and pre cooling etc. amounting to Rs. 18.32 crores. During the year 1998-99 MOFPI has approved 25 units of cold storage with financial assistance of Rs. 6.35 crore and in the current year ten proposals have been approved with a financial assistance of approximately 4 crores. The ministry is also working jointly with the organisations like National Cooperative Development Corporation, National Horticulture Board and APEDA towards this end. But these sources of financing do not seem to be adequate. A study by APEDA proposes total outlay of around Rs. 500 crore on the setting up of cold chains at some 62 centres in different states. We need to bring in the central and state industrial finance institution to make funds of this magnitude available to the entrepreneurs for building the cold chain network.

BOOK REVIEW

A guide to APPLIED NUTRITION by Prof. Sunit Mukherjee and Dr. S.C.Lodh, Published by Prof. Sunit Mukherjee Flat 5C, 107, Southern Avenue, Calcutta - 700 029. Phone: 466-3024, Price: Rs.95/,pp.108.

Various aspects of nutrition have been discussed in a simplified manner in this publication. The concept of balanced nutrition which is of utmost importance has been emphasised.

The authors have tried to evolve a simple, practical, reliable and scientific methodology for

assessing the nutritional quality of daily diet of any normal person. The method involves measuring the food by volume and then converting the same to dry weight and finally calculating the nutrients from the tables provided in the book.

A separate chapter has been incorporated on "Nutritional Labelling" for the benefit of food industry. 'Nutrition information label' on processed foods has become mandatory for export purposes, where not only calories, but also fat calories, saturated fats,

cholesterol, sodium, vitamin A, and such other information are required to be provided. Similar information on products of domestic consumption would also be helpful to attract customers.

The book will be a very useful practical guide to the industry, dieticians and individual consumers in planning different types of diets.

K.L.Radhakrishnan
Chief Editor
Indian Food Packer

Assistance from National Horticulture Board

National Horticulture Board (NHB) provides assistance for development of horticulture produce through various programmes right from production to establishment of grading, packing, transport, storage, marketing and processing facilities for ensuring integrated development of horticulture industry. Special emphasis is laid by NHB for strengthening post harvest infrastructure and development of integrated marketing network. Assistance is available for the following:-

- Integrated Project on Management of Post-Harvest Infrastructure of Horticulture Crops
- Development of Marketing of Horticulture Produce
- Market information Service for Horticulture Crops
- Introduction of New Technologies and Concepts in Horticulture
- Establishment of Nutritional Gardens in Rural Areas
- Alternate Structure of Marketing of Fruit Juices/Fruit based Beverages
- Transfer of Technology through Training and Visit of Horticulture Growers
- Techno Economic Feasibility Studies/Surveys on various aspects of Horticulture
- Assistance to the Professional Societies for Development of Horticulture

Nature of Assistance

NHB provides financial assistance for setting up the identified post harvest, marketing infrastructural facilities or any other activity under one of the above programmes. The assistance is provided in the form of Soft Loan and only service charges @4% is levied. Depending on the merits of each case, a moratorium upto 5 years can be extended and total repayment period including moratorium may not exceed 9 years. The loan quantum is to the extent of 50 percent of the project cost subject to a limit of Rs.1.00 crore per beneficiary. Preference would be given to the projects with lower gestation period, high profitability and contribution to the horticulture as a whole. The term loan would be disbursed through State governments / financial institutions / Banks as the case may be. Proposals have to be submitted in the prescribed proforma.

Further details can be obtained from, the Executive Director, National Horticulture Board, 85, Sector-18, Institutional Area, Gurgaon - 122 015. Phone: 343414, 341239 Fax: 342991

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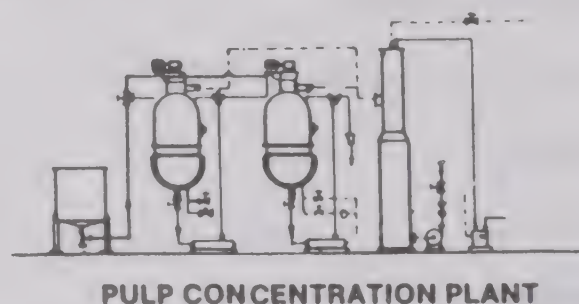
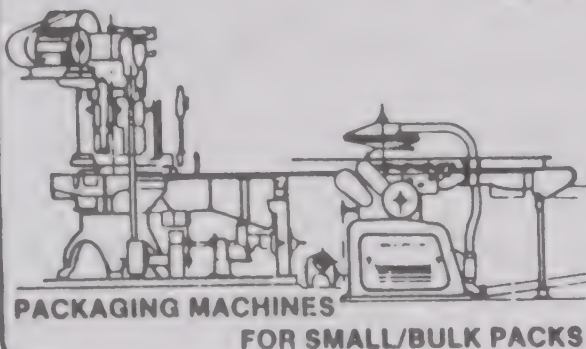
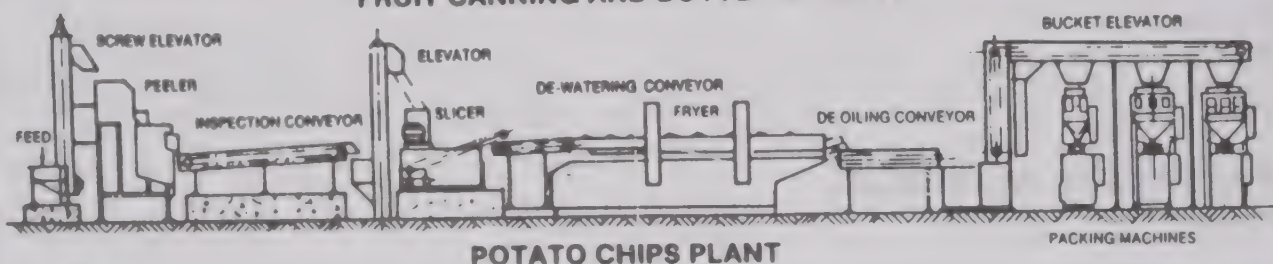
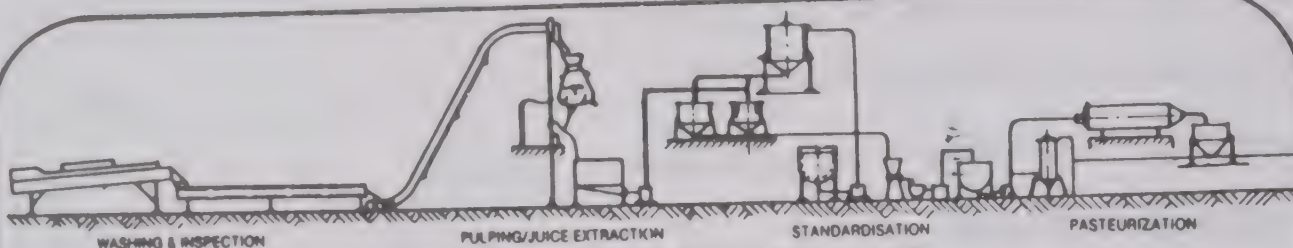
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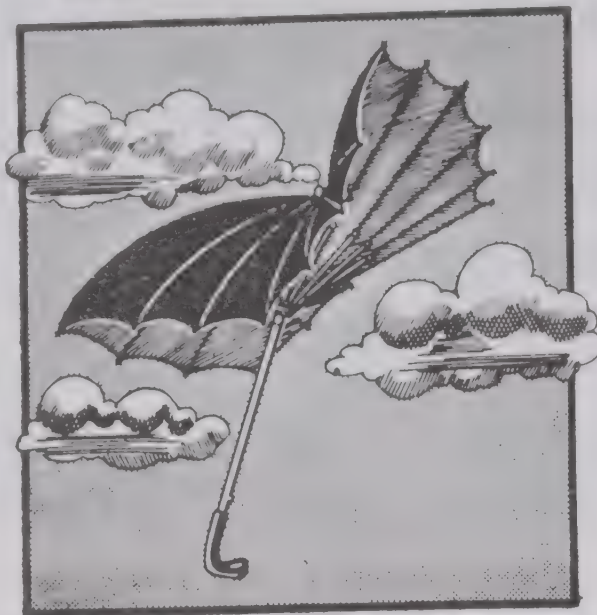
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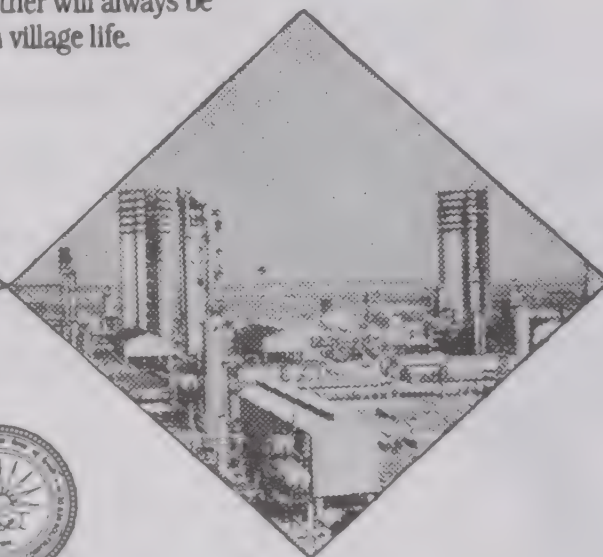
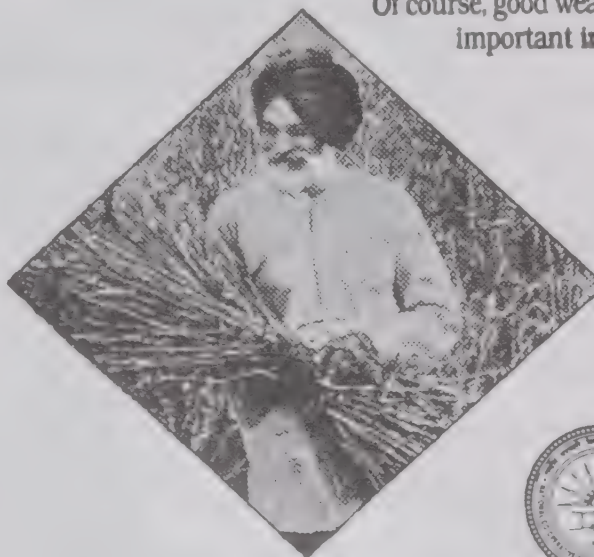
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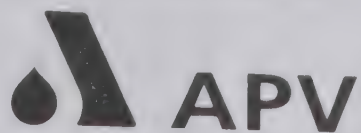
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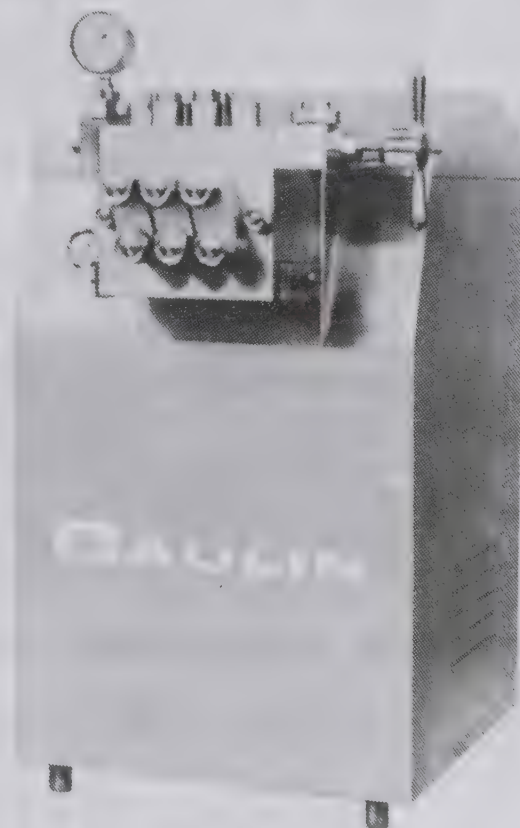
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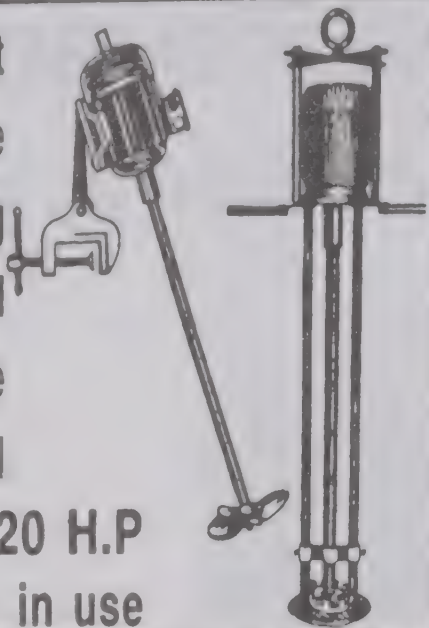
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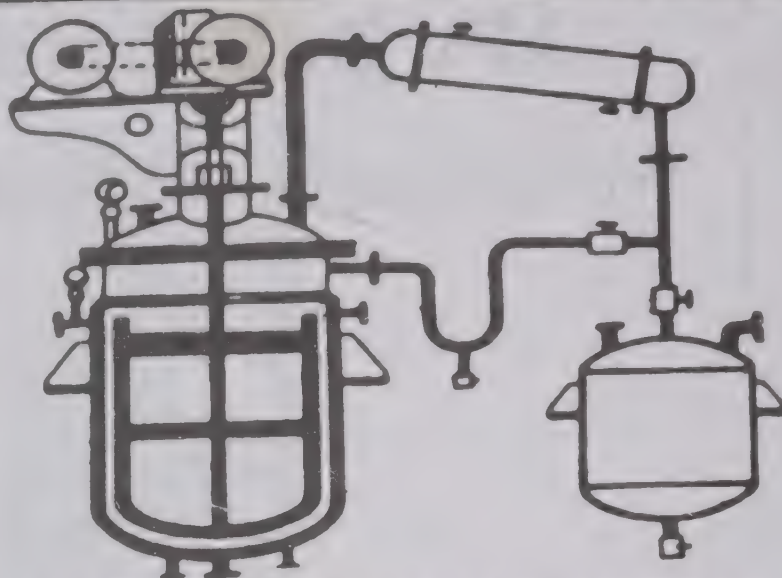
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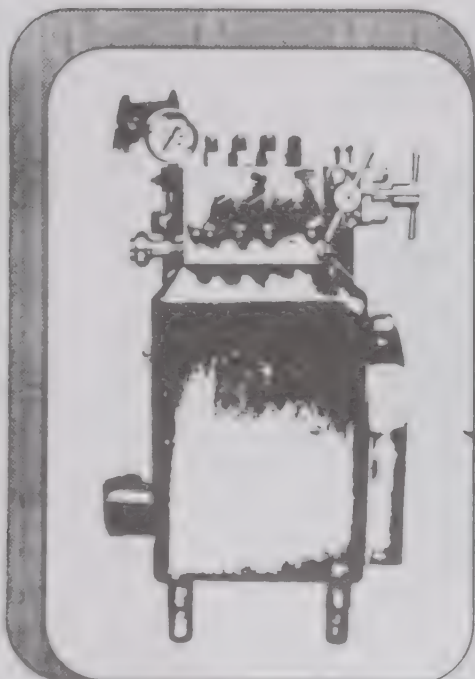
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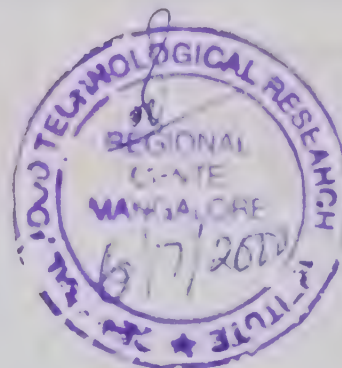
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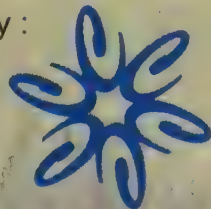
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Editorial

India is viewed as a very large market for Processed Food Products by the International Processing Marketeers of Food items in the World. India has signed WTO Agreement and is in the process of removing restrictions on Import of Food Stuffs in the Indian Market.

Exim Policy has already removed the restrictions of the Import of around 714 items and in the near future it is expected that a large number of food items will be made available to the Indian consumers' manufactured abroad. This will be a great opening for manufacturers and consumers alike. The manufacturers will gain from the new products supplied to Indian market and will take advantage for upgrading of their technology in the areas where there is a handicap and also produce new food stuffs.

Purchasing power of the consumers are increasing and large quantity of the new products will be in great demand even though slightly costly from Indian standards. In India, industry has a great opportunity to cash on a large market created by foreign processed food promoters.

Department of Food Processing Industries is planning to promote the Indian Processed Food Products. A generic publicity programme has been drawn out to promote processed food products to assist domestic industry to take on competition with the foreign industry launching their products in India.

Food adulteration is a serious area of concern for the unpacked food items of mass consumption. Vigilance from PFA department and guidance from Department of Food Processing Industries will be overcoming this problem of the Food adulteration. The consumer is entitled to the high quality of food stuffs. Opening of trade under WTO will make the consumers very choosy and selective to buy food stuffs.

We have a serious problem of quality water availability for a large population. The standard of water laid down will have to be adhered to in order to save human lives. Drinking Water industry is already growing and according to one source has already touched Rs. 300 crore mark.

Companies like Dabur, Heinz, Hindustan Lever Limited, Britannia, are producing stream of new products and devising a market strategy. This gives a great potential for the Indian Industry.

State Govt. have very special role to play in manufacturing and distribution of quality products. Delhi Admn. needs to be complimented for their movement against the watermelon sellers violating normal ethics and resorting to adulteration and malpractices. Such efforts needed to be encouraged by public opinion and the culprits must severely be punished.

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ASSOCIATION NEWS

Minutes of the meeting of the Executive Committee held on 6th March 2000 at 3 p.m. in the Conference Hall of Consultancy Development Centre (CDC), New Delhi.

President, Shri Gokul Patnaik welcomed the members and raised the issues connected with the Union Budget Proposals for 2000-2001.

He requested Dr. S. Jindal to discuss the Budget provisions in detail.

Dr. S. Jindal, gave the details of impact of the budget on the Processed Food Industry. He informed the members that the Ministry of Finance was given exhaustive representations about the budget proposals and explained the seriousness of the high taxation policies. The Secretary, Department of Food Processing Industries had made a strong case during pre-budget presentations in Ministry of Finance and supported the industries' views. Infact, the Union Budget proposals appear very much arbitrary and unrelated to Economic Review 1999-2000 as also contradictory to the main strategies highlighted by the Finance Minister himself in his budget speech.

Intervening in the discussion President highlighted that we can't ask the Government to exempt all the processed food products. However, we should consider if consensus emerges to deal with three categories of Processed foods. Those items which are under the

concept of 'Perishables' i.e. Fruits & Vegetables, Milk, Meat etc. should be proposed for total exemption and other items may be pleaded for duties at the level of 1999-2000 with adequate abatement levels.

Dr. A.G. Naik Kurade pointed out that this budget shows a negative attitude of the Ministry of Finance towards perishable food processing industry.

President said that the beverage industry has also to bear heavy taxation. The abatement should cover the reimbursement of actual expenses incurred by the industry.

Dr. Kurade proposed that the exemption limit for Small Scale Industry Units must be raised to Rs. 1 Crore.

Shri H.C. Lal proposed that the representation should concentrate on perishable products in Agriculture and Horticulture highlighting that there is a huge wastage of around 37% in this area.

Shri Pradeep Chordia, Sh. Y.K. Kapoor, Sh. B.L. Kapoor and Sh. P.P.S. Dhillon supported the issue of perishability and Small Scale Industry Units. Dr. S.K. Roy suggested that the Nutrition aspect

should also be highlighted. Sh. George Isaac raised the importance of the Processed Food Industry as these meet the needs of the armed forces and national natural calamities such as during cyclone, earthquake, floods etc. He highlighted the difficulties faced by the industry in the process of tax collection and wanted that the logic of tax collection must be explained by the Ministry of Finance and said that the industry was pained that their viewpoint was ignored.

Sh. Vinod Thacker wanted that Government should exempt Small Scale Industry Units from Excise and Sales Tax both.

Mr. Piruz Khambatta stressed that processed food is not luxury item and therefore awareness should be created to dispel this logic.

Shri Vinod Thacker wanted extreme steps to draw the attention of the Government because this is the procedure of the present culture.

Sh. H.C. Lal proposed that in order to immediately draw the attention of the Government, Ministry of Food Processing Industries should be requested to take up this issue.

President suggested that the issues raised should include aspects of wastage and convenience to the middle class working family. Zones and Chapters should take up this issue in each state and the Ministry of Finance must be pressurised to withdraw the duty hike.

Sh. R.L. Chopra brought out that an agitational method should be adopted. He wanted that we must aggressively work with the opinion makers such as MPs, Social Workers, Consumer organisations as was done in the past and write weekly letters repeatedly to highlight our view point particularly relating to Horticulture and Agriculture growers and difficulties faced by them in disposing of their products in glut seasons.

Sh. Rakesh Jindal also supported the farmers' view point. He was of the view that the excise duty must be calculated on ex-factory price.

Sh. Y.K. Kapoor proposed that a separate fund should be created for this work to be effectively progressed. He and Dr. Kurade proposed the name of Mr. R.L. Chopra to become the convener of this Committee with co-opting two more members.

The Committee should undertake;

- i) Advertisements in News Papers.
- ii) Mailers to MPs and other opinion makers.
- iii) Approach MPs personally.
- iv) Follow up with the

Ministry of Food Processing Industries and through them to the Ministry of Finance.

- v) Pursue with the State Governments.
- vi) Local press from the States in addition to Central News Papers.
- vii) Mobilise opinion of the growers.
- viii) Work with consumer organisation.

It was pointed out that a large variety of imported products are flooding the market at cheaper prices and it is likely that in a few years the indigenous food industry will die. Moreover, it was seriously observed that the imported products grossly violated Indian Food Laws in terms of additives, Weights & Measures, Labelling, etc.

Sh. Piruz Khambatta brought out that APEDA assistance schemes need to be reviewed to really help the exports.

President summarised the discussion highlighting that;

- i) Local industry needs to be protected with protective tariffs.
- ii) Local food laws (PFA, Packaged commodities order etc.) should give a fair field to Indian Industries to operate.
- iii) Imported goods should conform to Indian food laws. The temporary strikers should not be allowed on

foreign food stuffs and only proper labels should be permitted.

- iv) Importers should be registered.
- v) Ingredients should be declared on the imported packed foods.

President thanked the members for their inter-action and wanted members to be actively involved in the activities of the Association so that better services could be given to the industry. Chapters were also requested to be more active and hold monthly meetings.

Shri Piruz Khambatta wanted notification of PFA to be sent urgently for comments to the industry.

Dr. V.V. Karnik desired that corporate members must be persuaded to attend all Executive Committee Meetings. He expressed that the AHARA is losing its charm. The presentation was not very attractive. There is a need to do more work to organise such fairs. It was suggested that exhibitions and expositions may be organised by the Association in important cities, practically on self-financing basis.

Mr. George Isaac wanted that the Association should hire space in international exhibitions also and share the costs with members and exhibit their products.

These suggestions were noted with interest by the President.

Sh. Vinod Thacker raised the issue that a letter written to the

President by Sh. S.N. Mitra may also be discussed in the meeting. President informed that he has solicited the views of other members and wanted to reply to Mr. Mitra by a personal letter. However, he expressed his personal sorrow for delay in reply and assured to respond to Mr. S.N. Mitra at the earliest as he is his personal friend at Calcutta and he always needs his support.

Sh. Vinod Thacker desired that Sales Tax being considered by the Chief Ministers' Committee should be rationalised and not raised by the state governments.

Dr. Jindal assured that a representation would be sent to West Bengal Government on this issue since they are the co-ordinator, though we have already taken up this matter with the Ministry of Food Processing Industries.

On demand from the members, Sh. P.P.S. Dhillon and Sh. George Isaac gave a brief review of the presentation made about PFA amendment in the Ministry of Health. It was highlighted that the three associations CII, CIFTI and AIFPA are unanimous on all the changes and proposed the same view point. It was informed that the extracts of the presentation are being published in Indian Food Packer.

Sh Vinod Thacker suggested that the next meeting of the Association may be planned at Calcutta. President will examine this proposal and decide.

The meeting ended with thanks

to the Chair and the members were requested to join for tea.

K.P.Sarin

Executive Secretary



Soilendra Krishna Mitra Award

While publishing the details of the above Award in the Nov-Dec 1999 issue of the "Indian Food Packer" on page 10, the name of the person who instituted the Award was not mentioned by oversight.

The above Award has been instituted in 1999 by Sh. S.N. Mitra, Chairman & Managing Director of Mida & Company (Pvt.) Ltd., Calcutta in memory of his late father. The Award carries a Gold Medal & a Citation and will be given each year to an outstanding person in Fruit & Vegetable Preservation Industry/ Horticulture or related field.

T.Q.M. Workshop held on 21st March 2000 at Hotel Amritha, Trivandrum.

The workshop was organised by the All India Food Processors' Association with financial assistance from the Deptt. of Food Processing Industries, Govt. of India and in collaboration with the Kerala State Small Industries Association, the Gandhi Peace Foundation, Kottayam, and the Consumer Guidance & Research Society of India.

The workshop was inaugurated by Sri V. C. Kabeer, Hon'ble Minister for Health, Government

of Kerala. It was attended by Shri V. Jayachandran IAS, Principal Secretary (Health); Shri Janardhana Iyer, Retd. Chief Analyst, Government of Kerala; Sri Sivakumar, Technical Assistant, Directorate of Health Services; Sri Anil Kumar, Technical Assistant, (Law), Directorate of Health Services; Shri R.C. Mathew, Director, Bureau of Indian Standards; Sh. V.G.Sarvade, Inspecting Officer, Directorate of Fruits & Vegetable Preservation; Dr. Anandavalliamma, FAO Consultant on Food Safety Assurance Systems; and scientists from the Quality Control Unit of the Cashew Export Promotion Council; Dr. P.R.G. Varma, Principal Scientist, Central Institute of Fisheries Technology; the President of the Consumer Guidance and Research Society of India; the State President of the Kerala State Small Industries Association; Presidents of the District Units of the Kerala State Small Industries Association; Executive Committee members of the Kerala State Small Industries Association, the President of the Gandhi Peace Foundation, Kottayam, members of the legislature, the Press and the Public.

Apart from the above dignitaries a number of representatives of Food Processing Industry participated in the workshop. There was lively discussion when the importance of Total Quality Systems and HACCP procedure in order to ensure production of safe food was emphasised. Considerable discussions also took place with

regard to the problems faced by the Industries in the implementation of PFA act and rules thereon. It was pointed out that a lot of harrassment was taking place at the hands of enforcement authority even for minor variations. PFA Act, therefore, needs to be reoriented to the present needs and streamlined.

The Minister Sri V.C. Kabeer and Principal Secretary Shri Jayachandran IAS pointed out that both the Govt of India and the Govt of Kerala were seized of the problem and that a Committee was studying all related issues.



TQM Workshop held at Vadodara on March 21, 2000

This workshop was the 5th in the series on TQM organised by AIFPA with assistance from Dept. of Food Processing Industries, Govt. of India.

Mr. Vijay Shah, Chapter Chairman of AIFPA, Vadodara welcomed the invitees to the function viz Mr. H.L. Gupta, Mr. Asutosh Patel, Mr. Das, Dr. Sakrikar and Ms. Tuteja and also the delegates to the workshop. More than 32 members were present in the workshop including Members from South Gujarat and Saurashtra.

Dr. Sakrikar, General manager of Quality Assurance Services, Mumbai delivered the keynote address on "Safety Management in the Food Industries". Dr. Sakrikar, is a leading personality having varied business experience and presently working as a General Manager (Western Region) in the QAS, Mumbai. The QAS is the leading certification agency in India for Food Industries. The major clients from Gujarat Region are "Amul Dairy", Mother Dairy, Gandhinagar, Gujarat Coop. Milk Marketing Fedn., etc.

During his presentation on



HACCP he pointed out certain very good points for taking care during the manufacturing activity.

Mr. B.K. Das, Asst. Director of Gujarat Industrial Research & Development Agency, Vadodara and Ms. Sashi Tuteja, Coordinator, Faculty of Home Science, M.S. University of Vadodara emphasised the importance of Quality Control in Food Industries. Mr. Das dealt with utilisation and importance of packing material used in Food Industries. Mr Das also expressed his intention to set up a good Microbiological Laboratory in Vadodara in consultation with the Ministry of Food Processing Industries.

During the workshop, Mr. Chandresh Shah of Madhav Foods, Vadodara delivered a lecture on Quality Control and also played a key role as an anchor person during the whole workshop. The workshop ended with a vote of thanks proposed by Mr. Satish Khakhar of Rainbow Group, Rajkot.



TQM Workshop at Trivandrum



TQM Workshop at Vadodara

NEWS ROUND UP

York keeps greens fresh and crisp with Thermfresh

It is important to remove field heat off produce immediately after harvesting. Every hour saved between the time of harvesting and the removal of field heat can add a day's shelf life to the produce. As part of its extended marketing efforts, York Refrigeration will be focusing on fruit and vegetable cold storages in Asia. Its Thermfresh air handling systems are effective solutions to stop weight loss and extend shelf life of fresh produce through ultra high humidity fast cooling and storage.

Tropical fruits can benefit greatly from the Thermfresh system, which can be engineered for pressure cooling; pressure cooling and storage combined; long or short term storage; ripening or degreening; atmosphere control; and total refrigeration. Each unit design takes into account factors such as produce type (whether it is stored packed or unpacked), the physical characteristics of the storage area and climatic conditions.

The range's pressure cooling system cools produce down quick, often within one to two hours. Weight loss is reduced as fast cooling minimises moisture loss. (In some cases, weight loss is reduced to only a tenth of the previous technology employed.) This is achieved by forcing cooled, humid air under pressure through stacks of produce.

The system's air handlers range in capacity from 6,000 W/H (20,500 Btu's/Hr) to over 140,000 W/H (480,000 Btu's/Hr).

Pressure cooling can be combined with storage. Ultra high humidity environments are essential for the correct storage of fresh produce. Those stored at 90 percent humidity will lose moisture six times faster than produce stored at 98 percent humidity. The air handlers produce a true vapour, with no free moisture being entrained in the air. This enables the storage and ripening of produce, while eliminating the problem of free moisture being formed.

The heart of the Thermfresh system is the patented heat exchange unit. Each installation can be designed to operate from sub 0°C to 30°C. Over the complete range of temperatures, humidity is maintained up to 98 percent.

Thermfresh researchers carry out extensive testing into the weight loss, ripening and storage characteristics of each variety of produce before creating its own performance standard. Designers will then design and specify the entire project construction and outfitting. A trickle SO² system may be installed with the storage system to eladicate mould growth on the fruit surface. In certain applications, plastic tent into the total concept to control atmospheres in specific areas.

Advanced digital control panels are designed into large, complex systems where the cool rooms cater for a variety of produce held over different time periods. Temperature sensors are often included so that actual flesh temperatures can be recorded at different ends of the cool room.

Terence Tan, regional manager at York Refrigeration South East Asia, says, "We are looking actively into the storage of vegetables in Asia, where many economies are agriculture based. Examples include Bangladesh, Indonesia and Thailand."

Director Soren Bjerg adds, "Vegetable and fruit storage is important in high temperature countries, especially in this region where you have fairly huge wastage because of improper handling."

York International is the largest independent supplier of HVAC&R equipment in the US. The company recently acquired Sabroe A/S from EQT Scandinavia and Co. According to reports, the York Refrigeration the largest industrial and marine refrigeration products supplier in the world Sabroe, also a leading supplier of contracting services that include customised refrigeration solutions, has market strengths in Europe, Latin America and Asia. Former Sabroe CEO Ole Anderson is now president of York Refrigeration.

York International's revenues reached US\$3.3 billion in 1998. Total annual revenues for York Refrigeration Group, based on last year's results for York and Sabroe, were approximately US\$1.2 billion.

Asia Pacific Food Industry Oct. '99



Novel Bakery Products

Onion, one of the most widely used ingredient in Indian cuisine, has now found a place of pride in bakery products also. The sulphur-bearing compounds - allyl sulphide and propyl sulphide-present in the volatile juice impart the characteristic pungent flavour to the onion. The Central Food Technological Research Institute (CFTRI), Mysore, has developed a process to make crisp spicy onion biscuits, a novel product for the bakers' shelves, using sponge and dough method. Dough ingredients additionally include sesame, finely chopped mixture of onion, green chilli and coriander leaves. The product is sure to catch the consumers interest due to its crisp texture and spicy taste.

Another novel addition to the bakers' shelves from CFTRI is the *ragi* rusk. *Ragi* (*Finger* millet) is widely used in southern India as a staple diet and is quite nutritious being rich in calcium, protein, fibre and vitamins like thiamine, riboflavin and niacin. CFTRI has developed a process for manufacture of *ragi* rusk containing 40% of refined *ragi* flour along with other ingredients and additives. Compared to wheat rusk, the *ragi* rusk has better nutritional values providing 34 mg of calcium

and 283 mg of phosphorus in every 100g of rusk. Besides, it is also rich in nutritional fiber. The manufacturing processes for both onion biscuit and *ragi* rusk can be easily adapted by the small-scale bakery units.

CSIR News

30.10.1999



Food Products from Swallow Root

Swallow root is a tender, fleshy root of *Decalepis hamiltoni*, a plant growing wild in the forests of Western Ghats. The root, known for its strong aroma, has a sweet sarsaparilla like taste and a characteristic flavour. The fleshy roots are traditionally used in the preparation of pickles.

The Central Food Technological Research Institute (CFTRI), Mysore, has developed processes for several new products of the root. These products include sweet candies, syrup, ready-to-serve beverage and jam. The processes involve pre treatment to remove the bitter aftertaste that is characteristic of the root and a special pulping method to extract pulp out of the tough roots.

The swallow root candy can be used as a confectionary and also in ice-creams and bakery products. The flavoured syrup, obtained as a by-product during candy and jam preparations, can be used as a refreshing drink after dilution. That the *Ayurveda* medicinal system considers swallow root juice as a cure for digestive disturbances and as a good appetizer only adds to the

value of the drink.

CSIR News

30.11.1999



Biodegradable Plastics

The National Environmental Engineering Research Institute (NEERI), Nagpur, has developed a technology for the production of biodegradable plastics. This low-cost method involves the use of a combination of distillery wastes and microorganisms.

These plastics can easily replace the petrochemical-based plastics whose non-degradable property makes their disposal difficult. The technology is ready for transfer to industry.

CSIR News

15.12.1999



CD-Rom on Directory of Food Processing Machinery Manufacturers

A CD-Rom that provide information on Food Processing Machinery Manufacturers in India to the needy entrepreneurs has been compiled by the Central Food Technological Research Institute (CFTRI), Mysore. The CD-ROM was formally released by Dr. V. Prakash, Director, CFTRI, at the inaugural function of the Food Engineering Centre at the institute. The CD-ROM is the much enlarged version of an earlier print version of the Directory and contains a comprehensive database of all major manufacturers in the country and their machinery. The information

compiled covers over 750 manufacturers and 70 categories of machinery. It also contains a user-friendly browsing software which makes retrieval of information much easier. The software facilitates searching of the database for machinery type, manufacturer, city or state-wise. The retrieved information can then be printed. The disc also contains a multimedia programme illustrating the services provided by CFTRI, especially the Food Engineering Centre.

Releasing the Directory, Dr. Prakash said that the CD-ROM will fulfil one of the long felt needs of the industry. Plans are afoot to integrate the Directory with the Web site of the institute for regular updating and to facilitate on line access through internet, he added.

Further information on the directory and copies of the directory can be obtained from:

The Head, Food Engineering Centre, CFTRI, Mysore-570013 Fax : 0821-517233, e-mail : eng@cscftri.ernet.in

CSIR News 15.12.1999



'Increase share in global processed foods market'

Government laboratories, small scale industries (SSIs) and consultants should work together to increase the country's share in the international processed foods market, Vasundhara Raje, Minister of State for SSIs, has said.

Efforts were also needed to cater to the huge emerging market of

processed foods in the country with rapid urbanisation and rise in per capita income, Raje said inaugurating a two-day meeting on opportunities in food processing industry in the next millennium here.

A strong and effective food processing sector will facilitate diversification of agriculture too, she said.

Around 80 per cent of the food processing units are currently in the SSI sector and contribute about one-fifth of the total turnover of SSIs.

Rise in middle class population in the country would provide a major market for processed foods and attract investment to the tune of Rs. 160,000 crore in the next decade, P. S. Bhatnagar, Secretary, Department of Food Processing, said.

Development of food processing industry would open up employment avenues in rural areas too, he said.

Food processing industry should attend to development of human resource and packaging technologies which were being neglected currently. Many a time we lose business because of poor display of our products in market place, and neglecting human resource can be disastrous in this era of global competition, he said.

Cumulative investment by financial institutions in the food industry sector had increased from about Rs 6,500 crore in 1992-93 to Rs. 18,500 crore in 1997-98 a 200 per cent rise, Bhatnagar said.

However, the share of the food industry in the total sanctions by

financial institutions had decreased from about four per cent to 2.5 per cent during the same period, he said.

Processed food industry in India faced the problem of procuring raw materials of required standards regularly which needed urgent attention, he said.

Steps were needed to improve consultancy capabilities in several areas in food processing to meet the emerging trends. Bhatnagar added.

Inefficiency at all stages-agricultural production, distribution and marketing - also add to the problem, Ashok Pathasarathy, Chairman of Consultancy Development Centre (CDC), which is organising the meeting, said.

Rajasthan Patrika 25.12.1999



Plan to export fruit through Amritsar

Punjab, which has a surplus in vegetables and fruits has decided to export its produce.

Agriculture and horticulture departments experts will visit various foreign countries to assess the marketing of produce according to state Agriculture Minister Gurdev Singh Badal who was talking to mediapersons here last evening.

Mr Badal said that the expansion project of Amritsar international air port was going on war footing and on its completion atleast a dozen international flights would touch the air port.

Export of vegetables and fruits

could also be done through this airport and the state government was planning on cold storage facilities at the airport.

It has allocated Rs. 15 crore for the cold storages and will give subsidy to those constructing them.

It will also provide three lakh crates on subsidy basis to cold stores owners.

Tribune

26.12.1999



AP plans cluster scheme for mango

To arrest losses in the handling of mango at the pre and post-harvest stages, the Andhra Pradesh Industrial and Consultancy Organisation Ltd (APITCO), a single window PUS, has prepared a plan to bring the 32 processing units in Chittoor district under a cluster scheme which would convert units into a co-operative enterprise for capacity building, according to Mr. S. Srinivasa Rao, Managing Director of APITCO.

APITCO's services have been requisitioned by the Development Commissioner of Small Scale Industries at the Centre for the modernisation of the mango fruit processing units.

According to a study, India wasted more fruits and vegetables in a year than those consumed in the UK. In value terms, it worked out to a combined annual loss of Rs. 40,000 crores as revenue. If the losses were reduced to the maximum, the country could feed an additional 11.7-crore people in a year.

Mr. Srinivasa Rao told *Business Line* that unscientific handling of mango in Andhra Pradesh, which had attained a premier position in the crop production, had resulted in losses up to 30 per cent annually. It was high time the losses were checked to earn higher revenue for all those involved in the process.

The organisation had also taken up a feasibility study for the setting up of a cashew processing unit in Srikakulam district. For want of a processing unit, cashewnuts from the district were being sent to Kerala for the purpose.

For recycling agricultural and horticultural waste products after converting them into organic manure/bio-fertiliser, APITCO had entered into a tie-up with the Bangalore based Terra-Firma Biotechnologies Ltd which had pioneered the concept and set up three projects at Rajahmundry, Vijayawada and Guntur. Each project has a capacity to produce 3,000 tonnes of manure. Rallis India Ltd has agreed to lift the entire stocks at the rate of Rs. 2,000 a tonne and market the production through its dealer network at various places in the country.

For meeting the needs of different crops, micro nutrients are added to the bio-fertilisers. A total of 20 units to produce organic manures and bio-fertilisers from agro waste are to come up in the next two years.

To sustain soil fertility and ensure higher foodgrains production to feed the growing population the use of organic manure has become a

compulsion in most places with different agro climatic conditions. Total dependence on chemical fertilisers posed greater hazards to soil and its productivity for various reasons.

Mr. Srinivasa Rao said three more units for the production of organic manures at Visakhapatnam. Khammam and West Godavari districts had been identified and they would soon be taken up.

The cost of each unit worked out to Rs. 50-60 lakhs, most of which was due to the high land values.

APITCO, which has been formed to offer low-cost consultancy services to small-scale enterprises, gets 60 per cent of its revenues from the Government agencies and 40 per cent from the private parties.

It occupied the No. 1 position in micro enterprise development and has set up an office in Abu Dhabi in collaboration with a local company.

For 1998-99, APITCO earned a revenue of Rs. 2.35 crores and is poised to gross Rs. 5 crores this year. Of the Rs. 2.35 crores, profit accounted for Rs. 60 lakhs, Mr. Rao said.

Business Line

29.12.1999



Food Engineering Centre at CFTRI

A state-of-art Food Engineering Centre set up by the Central Food Technological Research Institute, Mysore, was inaugurated by Shri P.

S. Bhatnagar, IAS, Secretary, Ministry of Food Processing Industries, Government of India, on 26 September 1999. The facility is intended to cater to the training, designing and engineering needs of the Indian food processing industry, especially in terms of:

- Techno-economic assessment of processes; products and plant designs/profiles; and their optimization through rigorous pilot plant and other engineering studies.
- Assistance in test marketing of new products by serving as a production centre during implementation stages of the products by the new industries.
- Training of operators, technologists and engineers in plant operation, maintenance and trouble shooting in food processing plants.
- Designing new machinery and equipment with participation of the design centre and prototype fabrication shops.
- Creation of database and providing information to the industry on physical, thermal, chemical and engineering properties of raw materials, ingredients and finished food products.
- Pilot processing facility to the existing and proposed food industries to facilitate the decision making for selection of suitable machinery.
- Engineering consultancy to the industry for preparation of project reports and other techno-economic reports for setting up of new plants on a turnkey basis in collaboration with other engineering firms.

The Centre has been established with financial assistance from the Ministry of Food Processing Industries and CSIR.

CSIR News

30.12.1999



Industry urges altering of food adulteration Act

Representatives from the food processing industry have demanded that the government amend the Prevention of Food Adulteration Act (PFA) to allow Indian companies to use internationally approved food additives to stave off imports from abroad.

"Government should immediately amend the PFA to allow use of WTO-Codex approved food additives before the quantitative restrictions (QRs) on food imports are lifted by April, "Confederation of Indian Food Trade and Industry (Cifti) secretary V. Sardana told PTI here.

Sardana said while domestic companies are prevented from using these additives as per PFA, imported food stuffs using the same additives cannot be stopped from landing on Indian shores as per the WTO agreement to which India is a signatory.

"Already imported foodstuffs are flooding the Indian market and after the QRs are lifted, the domestic industry will be completely wiped out due to delays in amending the Act," he said.

Processed food majors like Dabur, Parle, SmithKline Beecham,

Procter and Gamble under the aegis of Cifti have made a representation to the health ministry which is responsible for PFA to allow the industry to replicate their international rivals.

The alarm bells started ringing after India agree to lift quantitative restrictions on around 700 US import items including food stuffs by April 1, 2000 and on another 700 items by April 1, 2001.

"These imports cannot be stopped unless there is a scientific justification as per WTO rules. If the government tries to stop them, it would be considered as non-tariff barriers and India can be dragged to the WTO dispute settlement body," Sardana said.

According to Cifti, although PFA standards apply equally to domestic and imported products, the government has pleaded lack of testing facilities at the ports to test these imports and reject them on health grounds and the only way out for India is to allow domestic companies to compete on an equal footing.

A majority of value-added food-stuffs like chocolates, flavoured milk, frozen foods and sugar-free preparations contain additives like emulsifiers, colours and essences which are not allowed by PFA, but find a ready market in India.

An US embassy report on Indian food laws points out that while continuously updated, the PFA is not always up to date with advances in the food processing sector.

"Moreover, PFA rules sometimes appear to be drafted in a manner which goes beyond the establishment of minimum quality specifications, such as prescribing recipes for how food products are to be manufactured. Companies can request to have the PFA amended.

"However, this is a cumbersome and time consuming process," the report says.

Commenting on domestic industry's losing battle, Sardana pointed out that 20 containers of fluid milk had recently landed at Chennai port, for a milk surplus country.

Business Standard 17.01.2000



New drier to preserve fruits, vegetables

A unique vegetable and fruit drier which can preserve the produce for over six months without preservation has been developed by the scientists of the Centre for Application of Science and Technology for Rural Areas (ASTRA).

The drier by ASTRA, a unit of the Indian Institute of Science (IISc), removes the moisture from the vegetable/fruit and leaves it in a dry form which can be preserved in air-tight cellophane bags for long periods.

ASTRA scientists told PTI that the drier helps farmers not only in times of vegetable glut but also eliminates the exploiting role of middlemen during sale of the produce.

The drier, designed and developed by Prof. S.S.Lokrus, is a cabinet chamber with brick walls and provision for trays in layers to keep vegetables or fruits in their original form. The structure's top, bottom and side provide the three heating surfaces which are attached with metal coils that are heated using biogas.

The scientists explained that vegetables and fruits generally have 50 to 70 per cent moisture which is gradually reduced at temperatures ranging from 60 to 70 degrees Celsius, depending on the vegetable or fruit and the moisture content it has. The temperature can be regulated with a dial attached to the temperature meter which the operator has to watch at regular intervals.

The scientists said while the moisture was removed, the weight of the produce came down to 30 per cent of its original weight. The reduction in weight also makes it convenient for transporting the dried produce from one place to another.

The dried produce can be preserved in air-tight bags up to six months and will be consumed by just mixing water or milk before adding it to different dishes. It could be further protected, if required, by using accepted preservatives, the scientists said. They also assured that the moisture extraction had no effects on the nutritional value of the fruit or vegetable.

"The drier is designed in such a way that rural womenfolk can easily operate," said a scientist. Prof. Lokrus and his team started work on this project in 1990 when the drier

was successfully tested on arecanuts. However, now jack-fruit, banana, mango pulp, coconuts, tomato, potato, garlic, carrot, brinjal, fenugreek and coriander among other produce, can also be dried by this procedure using Prof. Lokrus' drier.

The Project was initiated with assistance from the Karnataka State Council for Science and Technology (KSCST). Today the technology has been disseminated to various organisations which work with rural areas and farmers. The KSCST has initiated a programme to popularise this drying technique in other States. It is working with the Sikkim Government to propagate a similar drier subsequently developed by the Tata Energy Research Institute.

Business Standard 17.01.2000



Centre to amend PFA rules

The Centre has proposed to make it mandatory for manufacturers, packers and importers of food articles to declare their address in full on the packages in order to bring greater transparency and quality control.

The move comes in the wake of the difficulties experienced by the health authorities in locating the premises of the manufacturers during the dropsy epidemic.

The problems arose as the present rules require only the address of the registered office of the original manufacturers to be indicated on the package and even brief details of the address are accepted.

Announcing the proposal, a spokesperson of the Health Ministry, said the declaration of the complete address has become critical, since the practice of franchising and packaging of foods by authorised agents of the manufacturers was becoming more prevalent and the increasing imports of processed food.

Hindu 19.01.2000



Fruit, veg. exporters seek airfreight subsidy

The Fresh Vegetables and Fruits Exporters' Association has urged the Government to grant airfreight subsidy on export of vegetables and fruits to all destinations in the upcoming Exim Policy for 2000-2001.

Currently, airfreight subsidy is given on exports of vegetables and fruits to Europe only.

"Ignoring or bypassing certain destinations and certain items hampers not only the growth in export of that particular commodity, but the efforts of the exporter in creating the market goes unrewarded," the association said in a memorandum to the commerce Ministry.

Canada is one of the major exporting destination with a huge potential. However, it has not been included for airfreight subsidy in the policy.

The association has also sought adequate representation for the exporters before framing the Exim Policy. "The policy should be consistent and comprehensive

guidelines should be brought out after giving due consideration to the existing export scenario." it added

Business Line 27.01.2000



Canada trying to carve a niche in processed food market

Canada is eyeing the huge Indian market for processed foods, with the quantitative restrictions on imports of all items set to be lifted by March next year.

Canadian agriculture and agri-food director (Asia Pacific) Sally Jorgensen is slated to arrive in New Delhi on Saturday on a week-long visit to assess the potential.

During her stay in India, she will meet senior government officials and businessmen in New Delhi and Mumbai to gather first-hand information on business opportunities. Commercial counsellor with the Canadian High Commission in New Delhi, Linda Brazeau, said that Jorgensen was particularly interested in knowing more about India's import regulations, labelling requirements, distribution and retailing of value added food products.

Canadian food companies will be interested in getting in touch with importers in India and also scout for joint venture partners for setting up food processing units. Two Canadian major food and beverage companies - Seagram and McCain Foods - have already set up wholly-owned subsidiaries in the country.

According to Senior trade advisor to the Canadian High Commission,

R N Gupta, with the opening of the Indian market for value-added food products, Canadian suppliers see a great potential to increase their market share in the years to come. They see high potential in dairy products, meat, bakery products, chocolates, sauces, jams, confectionery, maple syrup and canola oil.

Canada has emerged as the single largest supplier of green and yellow peas to India, over two lakh tonnes of which were imported in 1998 calendar year and three lakh tonnes in 1999.

The food sector is the leading consumer product sector in Canada, Gupta said. The annual exports of food products from Canada is of the order of 23 billion Canadian dollars and the domestic market is 85 billion Canadian dollars.

Against this, annual food exports to India are just around 100 million Canadian dollars. With the demand for processed foods estimated to triple in the next five years, Canada sees high potential in this sector.

The total annual trade between the two countries is around 1 billion Canadian dollars. At present, the balance of trade is in favour of India with exports to Canada around 600 million Canadian dollars.

Observer 28.01.2000



Website on food processing industry

The minister of state for food processing industries Syed Shanawaz Husain on Wednesday launched a

new website for the department of food processing industries. The website was launched in order to coincide with the launching of the website of the Prime Minister's Office which was also put on the net on republic day.

The site for the department of food processing industries can be reached at <http://www.nic.in/mofpi>.

The department of food processing industries had initiated an internal restructuring programme under the new minister. Amongst a host of other new steps that the department has initiated is the framing of a new food processing policy which is expected to be launched with in the first quarter of the new year itself.

The department is also planning to establish food parks in various states in order to boost investments in the sector in a big way as well as to bring down the costs of operations by pooling in of resources.

In the scheme financial assistance to the tune of Rs. 4 crore is to be forwarded to the entrepreneurs for sector specific projects.

The department is also tightening its procedures for the funds released by it for assisting various activities by monitoring of the fund utilisation as well as accounting of the balance of the unspent amount.

Financial Express 28.01.2000



Zero power cold storage in Balikonta

Recently, a zero power cold storage was established by agriculture students at village Balikonta. This storage was developed by Dr. Sushant K Roy of Indian Agricultural Research Institute New Delhi. Vegetables and fruits can be stored for longer time period with this facility.

Few days back, under the guidance of agricultural scientist Dr. O P Awasthi (Horticulture Department) of Regional Agriculture Research Centre, Kumharawand, agricultural students Nitish. Tiwari, Deepak Gauraha, Kamlesh Sahu. Gaurav Mukim, Rajkumar Solanki and Rammohan Sao built a zero power cold storage at the backyard of farmer Chandranath Mali in village Balikonta. which is adopted.

The help of other farmers were also taken. On the occasion of inauguration of the zero power cold storage, Regional Director of Agriculture, Area Bastar Division. Dr. Mishra said, this is the first attempt made by the students which have been completed. Students have come forward with financial and technical assistance to establish two more such units in two villages.

Giving details about the zero power cold storage he said, technique involved is simple and cost effective.

For its working no power in electrical or traditional is required. It can be constructed from the materials available in the villages.

These included bricks, sand, khas, bamboo, jute etc. The only

main requirement is water which should be readily available.

All year round temperature remains low comparatively from outside and high humidity is maintained. These conditions are necessary for keeping the vegetables and fruits for longer time period.

The cold storage unit acts on the principle of latent heat of evaporation. The inside temperature remains 8 to 10 degree centigrade less than the outside temperature. The cost of the room is just Rs. 950.

That is why it is called as cost effective technology procedure. By this room the farmers at a very low cost can store fruits and vegetables for longer time period.

This technology has been developed under the leadership of Dr. Sushant K Roy of Indian Agriculture Research Institute, New Delhi. Normally it is seen that most of the storage facilities are mechanical and electricity is required in large amount.

The establishing such units is of high cost and maintenances also require heavy amounts.

Due to which it cannot be established at each and every nook and corner, overall easily. So this zero power cold storage can turn boon to the farmers.

During the programme, officers of agricultural department, farm scientists, students, farmers in large number were present.

Central Chronicle, Bhopal 28.01.2000



Stricter US controls on imported foods; more legislation, inspections on cards

In the US there is a heightened concern for spice cleanliness and food safety and, therefore, there is a trend toward increased legislation and inspections, with a major emphasis on stricter controls for imported foods.

This was stated by Ms Elizabeth Herman, the executive director of American Spice Trade Association, while talking on 'Current regulatory issues and the status of US regulatory agencies at the World Spice here today. She covered the current regulatory issues facing the spice industry including the President's Food Safety Initiative.

The initiative to enhance food safety envisages prevention of distribution of unsafe imported food and to destroy such foods that poses a serious public threat. It also proposes to set standards for private laboratories for collection and analysis of samples of imported foods as also to increase the amount of bond posted in imported foods when necessary to deter mature and illegal entry to the US.

It also envisages to enhance enforcement against violation of US laws related to the imposition of duties on goods including through the imposition of civil monetary penalties. The two related bills pending in congress are by Senator Collins to increase inspections and Senator Mikulski bill which differs from Senator Collins bill.

"If these bills are passed it will give the FDA authority to reject

imports" she said. The bills are kept pending due to the elections.

Similarly, the laws are going to be strict for import of foods, including spices. The EU legislation will be common for all the member states. "1997 Import Food Regulations prohibits import of unsafe food into EU," said Mr. Martin Muggeridge, European Spices Association technical principal. "Ethylene Oxide treatment is not allowed."

Heat treatment is the viable method for control of microbial contamination and it is applied prior to packaging. "Due to EU law, 80 percent of the production goes through best treatment process" he said.

Economic Times 29.01.2000



IDA plea on labelling packed milk

The Indian Dairy Association (IDA) has asked the Government to exempt pasteurised packaged milk from the mandatory "best before.....labelling" as packed milk was meant for daily consumption and had a short shelf-life.

Pasteurised milk was meant for daily consumption and had several limitations in its handling, distribution and storage in India the IDA President Mr. Animesh Banerjee, said in a statement.

He said the production system in India was different and milk in raw form had more bacterial content than in developed nations thus giving it a short shelf-life.

In a letter to the Secretary of the Ministry of Health Mr. Benerjee said the "best before....labelling" condition could not be applied on pasteurised milk in sachets and bottles until and unless they were sterilised and aseptically cleaned.

Business Line 29.01.2000



Response sought on non-veg food label

The Union Government has issued a Gazette notification dated January 5, inviting objections and suggestions from the public, within 60 days from the date of publication, seeking to define what constitutes "non-vegetarian" food and providing for mandatory labelling of such food on packages containing the said products. Suggestions or objections to the proposal may be sent by March 5.

Non-vegetarian food products will carry on the package a colour code, indicating its non-vegetarian nature, so that consumers may know what they are going to consume. Use of the colour code will also help to communicate the nature of food product to all sections of society, irrespective of their literacy status, according to an official release.

Economic Times 31.01.2000



Tomato Output in Punjab up 3-fold

Within a span of five years from 1989 to 1994, the tomato yields in Punjab have increased threefold from 16 to 52 tonnes per hectare.

The total tomato production in the State increased to 1.3 lakh tonnes from 28,000 tonnes per annum, thanks to the efforts of PepsiCo which had achieved this progress through the introduction of contract farming.

In 1989, PepsiCo, in the belief that adequate tomato was available, had imported a modern, 30-tonnes per hour capacity tomato processing facility from Italy. The company wanted to export aseptically packed tomato pastes and purees. However, the company found that Punjab produced only 28,000 tonnes of tomato per annum while its annual requirement was 35,000 tonnes.

Faced with shortage of raw material, the company had explored the possibilities of boosting tomato production in the State. It brought out a blueprint for agricultural practices that would increase yields to international standards, reduce overall costs and make its products internationally competitive.

According to Mr. Abhiram Seth, Director of Pepsi Foods, Gurgaon, the company felt the need to introduce contract farming to achieve its objectives. PepsiCo's contract farming programme included nursery supply, technology transfer, commercial support and R & D activities.

Mr. Seth, in a paper presented at a national seminar on 'Post harvest management of crops and cold storage,' said the efforts had resulted in reduction of costs to levels that would make the company competitive internationally.

He said through the introduction of contract farming, PepsiCo had been able to secure uninterrupted and regular flow of raw material and protection from fluctuation in market pricing.

Business Line

01.02.2000



Highlights of UN food biosafety protocol

Key provisions of the UN-sponsored Biosafety Protocol approved by representatives of more than 130 countries in Montreal on Saturday:

- Preamble recognises risks and benefits associated with biotechnology and the need to protect biological diversity.
- Preamble emphasises protocol "shall not be interpreted" as changing the rights and obligations of countries under other international pacts, such as the World Trade Organisation.
- Preamble also recognises trade and environmental agreements should be mutually supportive and the protocol is not subordinate to other international pacts.
- The protocol establishes a Biosafety Clearing House for countries to share information about genetically modified organisms (GMOs). Countries must inform the Clearing House within 15 days of the approval of any crop varieties which could be used in food, animal feed and processing.
- Exporters are required to obtain an importing country's approval, through a procedure known as

advance informed agreement (AIA) for initial shipments of genetically modified organisms intended for release into the environment. Examples include seeds and trees.

- GMOs intended for food, feed and processing - in other words commodities - are exempted from the AIA requirement. However, they must be labeled "may contain" GMOs and countries can decide whether to import those commodities based on a scientific risk assessment.
- Negotiations on more detailed labeling requirements will proceed with the requirement they be completed no later than two years after the protocol takes effect.
- Countries do not have to have complete "scientific certainty" to block imports of a GMO they fear could be harmful to biological diversity and, by extension, human health.
- Countries also may consider "socio-economic factors," such as the impact on local farmers consistent with their other international obligations when making import decisions.
- Exceptions to the AIA requirement are granted for GMOs intended for "contained use," such as in research, and for GMOs in transit through a country.
- GMOs used as pharmaceuticals for humans are exempted from the protocol if they are addressed by other relevant international agreements or organisations.
- Members of the pact will cooperate to help developing countries build human resources and

institutions to make informed decisions about GMOs.

- New negotiations will be launched to address the issue of liability for any damage resulting from the cross-border movements of GMOs. The goal is to finish in four years.

- Countries have an obligation to inform affected parties and take other appropriate action if they discover an unintentional movement of GMOs across borders.

- If illegal shipments occur, the affected party can request the shipper to retrieve or destroy the GMO at its own expense.

- The protocol will go into effect after ratification by the 50th country or regional economic integration organisation that is a party to the 1992 U.N. Convention on Biological Diversity. It will be subject to review at least every five years.

Economic Times 01.02.2000



Subsidy scheme for cold storages

A capital subsidy schemes for the construction or expansion of cold storages for horticultural produce has been introduced by the Union Government to be implemented through NABARD and the National Horticulture Board.

Capital subsidy to the extent of 25 per cent of the project cost, subject to a maximum of Rs 50 lakh, will be released by NABARD on the completion of the project.

Cooperatives, companies, corporations, agro-industries corporations, growers' associations, partnership and proprietary firms will be eligible to take up cold storage projects, said a NABARD statement.

The bank will provide 50 per cent of the project cost as loan and 25 per cent will have to be contributed by the promoters.

NABARD will provide 90 per cent refinance at 8.5 per cent rate of interest to the financing bank. The ultimate borrower will get loan from the financing bank at 1 per cent above the prime lending rate of the bank concerned.

Tribune Chandigarh 03.02.2000



Punjab to boost fruit juice sector

Buoyed by renewed interest of international investors in the agro-industry in Punjab, the State Government has decided to throw open its fruit juice sector for foreign investments in a big way.

The State's had tasted success with the Pepsi tie-up, where the multinational soft drink major invested heavily in potato and tomato products and was responsible for the prosperity of thousands of farmers.

The State renewed interest in the agro-processing industry was highlighted at the recently concluded Krishi Expo, where the Punjab Agro Industries Corporation had participated in full strength.

"After the success of potato/

tomato experiment with Pepsi, the fruit juice sector is attracting lot of attention, "an official at the fair told *The Tribune*.

As a first step, the PAIC is now seriously considering the proposal from a Canadian fruit juice major for setting up a plant in the State.

The Canadian proposal, which is for setting up a project worth Rs. 20 crore, is only on an experimental basis to test the waters before big investment in this sector flows in, the official added.

He said the State had great potential to tap foreign investments in the fruits sector as it was rich in production of several fruits.

The main fruits grown in the State were kinnow (275,000mt), orange (66,000mt), mango (97,000 mt), grapes (66,000 mt) pear (125 mt), peach (72,000 mt), lichi (13,000 mt) and lemon (6,600 mt).

Most of these fruits are available only during winter season, when the demand for them are low. These fruits could be made available throughout the year, the official said.

According to PAIC's estimate, the state has the potential of generating over Rs. 250 million in the fruit juice concentrates, over Rs. 500 million in processing and preservation of fruits and vegetables and about Rs. 100 million in the export of fresh fruits and vegetables.

The fruit juice units would primarily cater to the export market and the state would earn substantial foreign exchange by this venture, the official added.

The PAIC has so far implemented 27 projects worth Rs. 3816 million which have resulted in the development of the state's economy.

Tribune Chandigarh 07.02.2000



Marketing cos to gain from end of quota regime

Domestic companies selling value-added food products will be hit once import quotas are lifted this summer, says industry analysts. But those in the mass market segments may not be affected just yet.

The analysts point out that success in the food business hinges on an effective marketing and distribution network. Global companies that want to penetrate Indian markets after import quotas are removed may first have to resolve this aspect.

"Food is local," says CII's Dilip Chenoy, quoting FAIDA, the McKinsey-CII report on the food industry. "The removal of import restrictions will affect only the upper segment of the industry where distribution is not critical.

It turns out, however, that the value-added, upper segment is where the profits for the food industry are.

Mass market products, where existing companies have an edge owing to their distribution and marketing, are also the ones where profit ratios are low.

"The overall impact of quota removal will be pressure on margins in the domestic food industry," says

sector analyst Vijay Sardana. "Segments from where companies skim profits will be the ones where competition from imports will intensify."

A squeeze on profits could, in turn, affect companies' ability to invest in brand-building, marketing and R&D.

Sardana points to dairy products, including processed cheese, packaged tea and coffee and squashes-value-added products on which import quotas are due to be lifted by April 1 as required by World Trade Organisation (WTO). These are also items where profit margins are high.

Also in the list are items like processed fish and meat, and "sparkling wine" for which quotas will end.

While this may offer choice to the consumer, the impact on domestic business may be scattered since there are no large, organised players in these segments.

Without quota curbs, these items can be imported in any quantity, though they will be subject to customs duty.

But analysts do not see high duties being used as a respite for food companies in the country.

"Others could retaliate by slapping high duties on Indian products, or get the WTO to intervene," says an industry observer.

The other instrument to restrict imports, post-quotas, could be based on sanitary and phyto-sanitary standards. Imports can be blocked on the ground they do not meet

specified hygiene and public health standards.

"But we are on weak ground there," says an industry analyst. "Our Prevention of Food Adulteration laws fail as a means to check imports."

It is misleading to suggest, however, that existing companies here have nothing to gain if import restrictions are eased. Some in the sector see a big opportunity.

"Home-grown marketing and distribution companies stand to gain since global food majors will look for tie-ups", suggests a senior manager of a food MNC. "Even existing food majors may look to leverage their strengths here and enter into partnerships".

Besides, food MNCs that are major players here can bring in products from their global portfolio more easily once quota restrictions go.

Industry players here do, however, rue the fact that they now have to compete after having to operate under restrictions on investment (small scale reservation) and archaic food laws that hindered innovation. But the task ahead is clear.

"Companies will increasingly create food products that offer value to consumers, such as saving time or effort, and for which they are willing to pay a premium," says Sardana.

"That will be the only way to survive.

Business Times

07.02.2000



Lift restrictions on Indian spices, meat and textiles'

India on Tuesday asked Turkey to lift restrictions on items such as spices, meat products and textiles being exported from the country to help expand bilateral trade and economic cooperation between the two nations.

"One of the ways in which India and Turkey could improve bilateral trade and commerce, was by promotion of joint ventures between the two countries," Union Minister for Commerce and Industry Murasoli Maran said addressing the inaugural session of the Indo-Turkish joint commission meeting (JCM) here.

Welcoming this suggestion, Turkish minister of state Abdulhaluk Mehmet Cay said that Turkey has 17 free zones which had become an attraction for foreign investment especially for export-oriented units.

Turkey was adopting the low protection rates of EU as a result of which overall tariffs in the country have come down to four per cent from 15 per cent and are likely to further scale down to two per cent, Mr. Cay said, adding that the nation was ideally placed to facilitate entry into other markets such as Balkans and Central Asia.

The bilateral trade between the countries in 1998-99 stood at \$273.04, an official release said.

Observer

09.02.2000



Kerala food park woos investors

The new food park of the Kerala Industrial Infrastructure Development Corporation (Kinfra) at Kakkancherry, touted as the first of its kind in Asia, has made a major breakthrough in attracting investors by selling off all its space offered under a special scheme announced three months ago.

Forty business groups had applied for space in the park, located in the northern Malappuram district, and 10 of them have already occupied the space, according to Kinfra sources. The park envisages an investment of Rs. 3 billion. Over 1,000 people are expected to find direct or indirect employment in the park.

The park, offering basic facilities of international standards, will concentrate on the production of processed food. It has modern facilities for pollution control, storage, quality control, training and communications. Since the park is located in the Malabar region known for its abundant agricultural produce, Kerala could make a mark in the processed food sector. Processed food accounts for only 10 per cent of total food sales in the country. Kinfra would be offering assistance to prospective businessmen right from the project report stage. Kinfra Technical know-how park nearby provides modern communication facilities. The Kozhikode international airport, Kozhikode university, Kerala agricultural university, Thevannur agricultural engineering college and the Electronic design and technology

centre come within a 100 km radius of the park.

The 10 business groups which have already taken over space said they would market mineral water, cold drinks, cakes, etc.

Newstime

10.02.2000



First food processing park at Butibori soon

Maharashtra's first food processing park will be set up at Butibori, around 30 kms from announced Minister for Nagpur Agriculture and Textiles Ranjit Deshmukh.

Speaking at the agro development review meeting organised by the Vidarbha Industries Association (VIA) on Thursday, Deshmukh said it was on the initiative of VIA that the matter of setting up a food processing park at MIDC Butibori was taken up with the Maharashtra Agro Industries Development Corp (MAIDC). The location for the park was finalised recently at MIDC, Butibori. MAIDC in consultation with the VIA has submitted the proposal to the government.

According to Deshmukh, the food processing park will provide all required infrastructure for agro-based industries. It will be equipped with modern equipment, he said.

The meeting at VIA reviewed the progress made by various agencies on the action plan discussed during the last meeting. Deshmukh also visited the sites identified for the

agro park. Major decisions taken during the meet included documentation of technologies ready for commercialisation in Vidarbha by the PKV vice-chancellor before March-end.

Alternative cropping patterns, agri business including aromatic and medicinal plants will be finalised by the PKV before June next. The CFTRI will produce a document for Vidarbha region for adoption of agro produce within the next three months.

It was decided to connect all taluka-level officials by an agricultural network before March next.

Indian Express 14.02.2000



Britain's most popular biscuit-now in India

Biscuit buffs in India can now enjoy a regular, consistent, fresh supply of the world famous biscuit brand McVitie's at stores across India. This range features not only the best selling biscuit in the UK-McVitie's Digestive-but also one of the best known biscuits in France. BN. McVitie's Hob Nobs is a much newer biscuit, developed only 15 years ago, but it remains the most successful new biscuit to be launched in the UK this century. The other brand now available in India is Ginger Snaps and even more brands are proposed to be introduced.

United Biscuits have been reviewing India as a potential market for McVitie's biscuits for a number of years and the present launch in the metros and Bangalore and

Hyderabad, is a step into the biggest biscuit market in the world.

McVitie's is the flagship company of a British-owned multinational food company, United Biscuits (UB). Mc Vitie's, the dominant biscuit brand in the group, was established in Scotland over 150 years ago. UB's principal business is biscuit manufacture with world wide sales of nearly Rs. 70 billion, but it also has interests in frozen and chilled foods and snacks. UB holds 19% of the Europe biscuit market and around 42% of the UK market. The group enjoys the support of the largest biscuit research and development centre in the world. This resource, near London, employs over 100 food technicians and is wholly owned and controlled by UB.

Apart from Europe, UB has operations in Asia, Russia, Middle East and the US. Yeses Global Trading P Ltd., Chennai, a partner firm of the popular Yeses supermarket store chain in India, are the sole importing agents of McVitie's biscuits in South India.

Rajasthan Patrika 14.02.2000



\$2-b opportunity seen in fresh foods

Rabo India Finance Private Ltd. sees a \$1.5-2 billion business opportunity for corporates in the arena of fresh foods in India, primarily by way of containing wastages, said a senior official.

"Currently, the fresh foods industry in India is around \$10

billions. Nearly 35 per cent of this industry ends in wastage due to the absence of the required infrastructure. We think that at least 15 per cent of this \$10 billions can be converted into business opportunities," says Mr. Mark J. Lobo, Director & Head of Advisory, Food & Agri-business, Rabo India Finance Pvt. Ltd. which is a subsidiary of the Dutch-based Rabobank International.

The driver of this corporate opportunity would be consumer demand which would manifest either through retail outlets or processed foods, he said. Change in consumer demand would be a deciding factor for future investments for corporates.

However, issues such as food security, safety and quality would be important in determining consumer demand. Indian corporates, he believes, are positioning themselves to tap this opportunity.

Currently, Rabo India Finance Private Ltd. has an asset base of Rs. 250 crores in food and agri-business and an equity of Rs. 106 crores, which is seen growing to Rs. 1,000 crores.

According to Mr. Arend M.A. Heijbrock, senior industry analyst, Beverages and Produce, Rabobank International, there is a need to change the concept that corporates are enemies.

"There is a need to strengthen food supply chain, thereby reduce wastages," he said.

Corporatisation of agriculture in India is very limited, he says. According to Mr. Heijbrock, in the

processed foods division. corporatisation nation is to the extent of 3-5 per cent while in the fresh foods business it is even smaller at 1-2 per cent.

Corporates will make the big difference in perishables where huge amount of wastages occur. "This is an area where the Govt. plays an important role. It has to be a facilitator to the corporates in controlling wastages and may be withdrawn completely from this arena and leave it to the corporates," avers Mr. Heijboek.

Rabobank International, which commenced operations more than 100 years ago, started as farmers co-operative bank. Currently, 60 per cent of its assets are in agri businesses.

According to Mr. Labo, the non-banking finance company is looking at high growth areas such as poultry, dairy, fruit and vegetables.

The other areas it is looking at are sugar, beverages, oilseeds, fertilisers and agricultural inputs.

It has set up an agri-service centre providing a system whereby link with the farmers is established at one end by the input provider.

"The input provider's role is very essential primarily to improve yield and reduce wastages and thereby remove the number of intermediaries between the farmer and the end-user." Says Mr. Lobo.

Within the beverage industry in India, tea is a significant market in Russia. There is an increasing move by corporates to go into branded tea in a bid to protect bottomlines."

said Mr. Heijbroek.

While the supply chain in tea is the best organised in India, there is not enough re-investment in land, according to Mr. Lobo.

Therefore, branded tea is seen as the best bet. The industry is in the process of consolidation and there could be a lot of adjustments, he said.

Business Line 15.02.2000



APMC exits vegetable export venture

An ambitious project to airlift vegetables grown by farmers in the Pune region to the lucrative overseas market has run into rough weather with the Agriculture Produce Marketing Committee, one of the partners in the joint venture with the Agriculture Produce Marketing Board, pulling out on the plea that the project was commercially unviable.

The APMC recently exited the project, intended to procure remunerative prices for farmers, pointing out that the freight charges at Rs. 33 per kg of produce plus Rs. 3 as handling charge was frequently more than the price realised per kg of produce plus Rs. 3 as handling charges was frequently more than the price realised per kg of the produce sold in the overseas market.

"We are, however, ready to support the project if the Government subsidises the freight charges", an APMC spokesperson told *Business line*.

The project took off after many

false starts in October 1999, when the first consignment of produce left Pune for Sharjah.

The APMC and the APMB invested Rs. 1.5 crores each in the project and employed a Sri Lankan private flight operator to fly 14 tonnes of vegetables every week to the UAE market.

While the APMB officials refused to talk about the issue, sources said the weekly flights still continued, but the response from the farmers was now lukewarm since they found it more profitable to send their vegetables to the Mumbai market.

"It is also now evident that the market surveys conducted before the project kicked off were not thorough, since the demand for our produce seems to have been over-estimated", sources said.

Local industrial houses had, meanwhile, been using the free space on the flights to transport their export orders, sources said.

The APMB, however, does not want to give up the project. Sources said the Board was now in talks with cold storage owners who export produce to book cargo space on the flights.

An application had been made to the Customs department, seeking permission to import goods required by the local industry from the Middle East in a bid to offset the huge cargo fees the farmers had to fork out.

The local farmers are, meanwhile, waiting for better times now that the mango season is round the corner. Both the farmers and the

APMB said the thighs would automatically become viable since mangoes are the hot favourite in the West Asian market and price realisation per dozen would offset the freight charges to be paid.

Farmers in the Pune region had, over the past few years, been on the forefront to tap potential export markets for fresh and exotic vegetables such as red and yellow bell peppers, broccoli, leeks and mushrooms which command healthy prices in the European and West Asian markets.

Business Line

15.02.2000



Centre lines up sops for food processing industry

Food processing sector being one of the most vital segments in the agriculture business, the Government is preparing to offer a range of benefits to all those engaged in this sector. The agriculture ministry is currently negotiating the implications of these sops with the finance ministry.

Included in the list of various sops that are currently being considered for fruits and vegetables include tax holidays and excise duty waiver for processing units, low cost finance and subsidy benefits for testing laboratories.

These according to Agriculture Commissioner ACHazra are on the anvil and are likely to be introduced in the forthcoming budget proposals by the finance minister.

Speaking to *The Financial*

Express, after the inaugural session of the two-day 'Agri Corp India 2000' seminar, Hazra said, "The Government has in principle decided to give the food processing sector the necessary boost. We have proposed to the Centre various benefits in this regards and are hopeful that given the importance will be considered in the budget".

At present, the revenue from the highly unorganised food processing industry is estimated to be just around Rs. 8 crore. Waiver of the excise duty for these units therefore will not be a difficult task.

However, said Hazra, "The tax holiday and excise benefits among others will be available to those units which are closer to the producing centres. This will help the farmers get a better price and the processing units a better produce.

Further, the Centre is also thinking seriously to give "product-wise support and frame the overall policy with an aim to boost the processed food exports from the country.

"Over the past few years, India has lost a sizeable market share of the global trade in traditional agro-produce and also processed food items. Pepper and groundnuts are the two most important products that have lost sizeable marketshare in the global trade. With the necessary and focused policy support we aim to regain the lost market." Hazra said.

Asked whether the Centre has identified any organisation or body for certifying the quality of Indian

produce, Hazra said. "We are considering the same". No details were available. In this regard the Agricultural Produce Export Development Authority (Apeda), New Delhi, already has scheme of helping Indian exporters using the logo of Agri Produce of India.

According to its 'Scheme For Assistance to Promote Quality and Quality Control' Apeda helps to set up and strengthen testing laboratories by extending financial help to the extent to 50 per cent of the cost subject to a ceiling of Rs. 5 lakh per laboratory.

In addition, Apeda has a similar scheme for assisting exporters and producers to set up quality control systems such as ISO 9000, ISO 14,000 HACCP, TQM including consultancy, quality management and certification.

A 100 per cent internal scheme of Apeda includes activities related to standardisation and quality control such as preparation of quality assurance manuals, guidelines documents, standards upgradation, and recognition of laboratories for export testing certifying exporters as Premium Quality Exporters among others.

According to Hazra a national chair for agricultural marketing will be set up soon through the development and strengthening of primary rural markets, wholesale markets and terminal markets. In a bid to make the quality of agricultural and horticultural produce legalised, Apeda will be made a nodal agency, with the power to issue quality control certificates.

The proposed beneficial schemes of targeting increased exports of processed food products will further strengthen Apeda.

Financial Express 16.02.2000



Guidelines Framed for bottled water

Not all bottled drinking water is mineral water. So the government has now come up with stringent guidelines for filtered water sold for the price of mineral water.

The guidelines, under the Prevention of Food and Adulteration Act were notified about a week ago.

These make it mandatory for all containers of filtered drinking water to carry a bold label saying "Packaged drinking water".

The manufacturers will also have to ensure BIS certification.

Health official said packaged drinking water would mean water which has been subjected to simple treatments like filtration, aeration and reverse osmosis to make it nearly free of micro-organisms.

This is different from mineral water, which is derived from a specific source and confers certain health benefits. Packaged drinking water can be drawn from any tap.

Hitherto there have been no standards for packaged drinking water.

As a result, no quality checks could be carried out on such water, the officials said.

The new guidelines enunciate standards for this water.

Moreover, it should be packaged in containers made either of glass or plastic of the best quality. To ensure quality, the container should carry a BIS certificate.

The government recently updated the mineral water standards and made BIS certification mandatory.

The notification on packaged drinking water was stuck in the Union law ministry for a long time as the health ministry was not considered the nodal ministry for drafting rules on water. However, it was finally cleared after processed water was incorporated in the category of processed food.

Officials say this could be done as the international food standards, known as Codex, also have standards for processed water.

The health ministry is trying to bring about changes in the existing food standards to make them as stringent as Codex so as ensure that the Indian food industry is able to compete with foreign brands.

Times of India 16.02.2000



FI official underlines funding concerns

Suitability of technology to the Indian food processing industry is one of the key concerns of financiers as experience of the Indian banks and financial institutions has not been very positive, according to Mr. Brahmanand Hegde, Assistant Vice-

President, ICICI Ltd.

In a background paper on Financing of Agriculture in India for Agricorp 2000, Mr. Hegde said other concerns were with regard to the reliable supply of right quantity and quality of raw materials, which was difficult in most commodities. Lack of efficient supply chain for perishables, credibility of export buy-back arrangements and fluctuations in market, especially in the export-oriented commodities were the other concerns of financiers.

According to Mr. Hegde, a number of regulatory issues needed to be resolved before effective financing of this sector can take place. These related to taxes on processed food, dereserving more items for the large scale industry, development of domestic supply chain and development of export infrastructure.

He said the agri value chain needed a host of infrastructure services at various stages. These were farm equipment for cultivation, pre-cooling infrastructure at the farm level, storage infrastructure at the farm level, ware houses, specialised transport to warehouses, transportation to processing units, storage of processed goods and transportation to retail outlets.

"The whole system of agriculture credit has been marred by, politisation and low recovery, which are against the long-term interests of the sector," said Mr. Hegde. "While financing agri sector is complex given the different peculiarities and nuances associated with each sector, we strongly believe there is a large

unexplored opportunity for structuring innovative solutions," he added in his paper.

Business Line

17.02.2000



Aussies keen to set up cold chains

Australia - India Fresh Alliance (AIFFA) Charman Kevin Baddiley today said the Australia would help Indian fruit growers and traders set up cold chain network in India.

Addressing members of the Federation of Karnataka Chambers of Commerce and Industry (FKCCI) here, he said India has large potential to export quality apples, mangoes and grapes provided cold chains were put up by producers to deliver fruits at super markets abroad.

Mr. Baddiley said he was visiting India to study the process involved in the import, storage, distribution and marketing of Australian fruits in India and to identify possible joint venture partners. The Alliance has already held discussions with traders in Calcutta, Delhi and Mumbai. Out of the present apple production of 20 million cartons (1 carton equals 20 kg), Australia exports 1.5 million cartons, he said.

He said the Indian government should assist trade in setting up cold chains to increase import of Australian apples and citrus fruits into the country.

FWC Vice-President K Ramaswamy said exports of fresh fruit had witnessed tremendous growth during the last 15 years.

During the last one decade the exports had gone up by 100 per cent he said.

Deccan Herald

19.02.2000



Adulterators in a pickle

Here's a bit of spicy news, After bottled water, packaged beverages and sweets, the Prevention of Food Adulteration (PFA) department has turned its attention towards pickles and spices.

Acting on directives issued by Delhi health minister A K Walia, the PFA department has launched an extensive drive against adulterated spices in pickles. "After receiving complaints that certain brands of spices and pickles were adulterated, the minister has instructed us to lift samples from different parts of the city," says a senior official. While reputed brands with agmark seal are believed to be safe, the PFA department cannot afford to take any chances, with reports of fake brands flooding the market having come to our notice," adds the official.

Divisional commissioner S P Aggarwal, while maintaining that the government's aim is not to target any particular brand of spices or pickles, says, "Keeping a constant vigil on possible adulteration of foodstuff and edible oil is the PFA department's job."

With Delhi's consumption of spices and pickles being significant, adulterated *masala* and *achari*, if allowed to run loose in the market, could cause more than just a tummy upset. "While reputed brands of

spices and pickles are known to adhere to specified norms, the same cannot be said of 'loose' pickles and spices, which constitute our main target. This is not to say that we are not lifting sealed products. One can never be too careful with adulterated foodstuff," says the official.

"The efforts of the PFA's raiding teams apart, Delhiites are free to contact the local SDM with complaint regarding adulterated spices and pickles, To make the drive as transparent as possible, the PFA department's raiding teams are required to submit a daily report to the deputy collector, who, in turn, sends the report to me," says Aggarwal.

The PFA department's drive is being spearheaded by SDMs, who are also the local health authority (LHA) officers of their respective areas, and PFA inspectors. The SDMs are authorised to seek policy help if they apprehend trouble while lifting samples. Raiding teams have been instructed to comply with stipulated rules such as lifting at least three samples and sealing them in the presence of witness. The testing procedure involves subjecting one of the three samples lifted to a lab test. If this sample is found to be adulterated, the other two samples are screened to corroborate the finding. If these samples are found to be adulterant positive, the PFA department initiates prosecution proceedings. Food adulterators really seem to be in a pickle.

Times of India

22.02.2000



ICICI to raise exposure in food business

ICICI will take a significant exposure in the food and agri businesses in the next few years. According to Chanda Kochhar, general manager, ICICI, food is already a significant part of the company's portfolio with 172 companies receiving Rs. 160 crore from the institution.

The institution is also the implementation agency for a development programme in the sector funded by USAID.

About 34 projects have received an assistance of \$15 million in areas of pre-cooling of fruits or vegetables, cut flower production in poly-houses, oyster or button mushroom processing, dried flower processing, fruit and vegetable process which includes freezing and dehydration, essential oils or enzymes, herbal processing and cold chain.

ICICI proposes to get aggressive about the sector by funding new food ventures through its venture capital arm, ICICI Venture Capital.

ICICI will lend to various projects as priority sector lending. The ICICI group plans to become a change agent in the agri business.

It plans to get into consulting the players and play a liaison role, work with government on regulatory changes and partner with international funds and financial institutions. Bankers have apprehensions for investing in the food processing industry due to enormous lead times, regulatory and infrastructure constraints, reluctance

of players to make large scale commitments, improper backward linkage for sourcing and lack of food retailing networks among other issues.

Retailing in India is at a primitive stage, according to Kochhar.

"India is a nation of shopkeepers. There are 5 million retail outlets in the country with an average size of 150sq.ft. The average turnover of 77 per cent of these retail outlets is less than Rs. 40,000. Gross margins are under 10 per cent and there is a store for every 30 families. Deep seated mindsets have stymied healthy growth of distributive businesses and organised retailing," she feels.

Agri financing has been caught in a vicious cycle as a result of poor yields due to inadequate inputs, low investments in quality inputs, inadequate availability to reasonable finance, low cash generation, poor recovery levels and lukewarm approach by financiers.

Business Standard 23.02.2000



The carry-home king

When Gulam Noon was building a plant to produce frozen Indian food he went scouting for potential customers. One day he arrived at Birdseys, the leading frozen food seller, and walked out with an order so large that the size of the plant had to be doubled.

Noon, 64, is today among the largest providers of readymade Indian food in Britain and one of the richest Asian businessmen in the country, with a personal wealth of

25million. Noon Products makes more than three million meals a month for curry-loving Brits and Indians who can dig into a luscious *lamb pasanda* at a fraction of the price charged at any fancy restaurant. The fact that the products contain no artificial additives adds to the appeal.

Noon, originally from Rajasthan, landed in London in 1964 from Mumbai where he worked in the family's confectionary business. He still has a stake in the Bombay Halwa Company, which he started with another Indian. A venture with the Taj group to produce frozen food in New York failed to click, though. He sold his shares and returned to Britain to start producing ready-to-eat Indian food in 1959. And as he says, "We have never stopped since then."

Business India



Technology for Detection of Toxic Dye in Edible oils

Description : Detection of a toxic, cancer causing artificially added synthetic dye, butter yellow, in edible oils to safeguard the health of consumers. A screening tool to assess the genuineness of edible oils by cautious dealers, consumers/housewives, consumer organizations, food inspectors, analyst labs and as complimentary strips with edible oil packs by manufacturers. This simple chemically precoated paper strips for on the spot detection of trace quantities (10 PPM) of artificially added fat soluble dye in edible oils at the domestic retail shops and

remotest areas. **PLANT EQUIPMENT / MACHINERY** : Ordinary paper soaking tank, room temperature drying facility and printing of display holder at any printing press. **AREAS OF APPLICATION** : Health, edible oil industry. **ADVANTAGES** : Improves health care, Growing market. **STAGE OF DEVELOPMENT** : Commercialised. **ECONOMIC DATA** : Entire sales/profits depends on the marketing strategy adopted by the client and demand created through public awareness and inputs on publicity. The cost of each strip pack works out to around Rs. 5/- ensuring at least 10 tests. **TRANSFER FORMS** : Process know-how, Quality assurance methods, Process demonstration.

TBSE Newsletter Dec.99-Feb.2000



Nutritious Tomato Snacks

In an effort to take advantage of the growing consumer interest in nutraceutical/functional foods and the overall advancement of extrusion technology, the USDA Agricultural Research Service, Western Regional Research Center and Pacific Grain Products are trying to develop and optimize extrusion processing technologies for the production of novel, healthy, expanded, crisp tomato snacks. They are trying to develop processing regimes, which preserve and potentially enhance the phytochemical content in final products. After testing various technologies, a process combining drum drying and twin screw extrusion for the formation of 70% to 100% fruit and vegetable snacks

has been patented.

The launch of such tomato snacks would be beneficial to the California fruit and vegetable processing industry in that it would have the potential to increase utilization of processed tomato purees and pastes. Also the development of value-added products could improve the competitive advantage of California processors in the global economy.

The USDA nutrition pyramid recommends the consumption of 5-6 portions of vegetables and fruits per day, but surveys show that most people eat only half the recommended amount. Tomatoes are the vegetables containing the richest source of carotenoid and lycopene, which may reduce cancer incidence. As consumers learn more about the health benefits of tomato products, the need for novel products in convenient form will increase, making this research very timely.

Tomato News Feb. 2000



High Lycopene Tomato

Tomatoes with much higher levels of lycopene may be available in the future.

Scientist Betty Ishida from ARS has uncovered clues about ripening and lycopene formation while working on tomato tissue cultures. In a particular tomato variety, called VFNT Cherry, the fruit's green outer leaves ripened into fruit-like tissue.

The researcher found that low growing temperatures triggered ripening in nonfruit tissue. Because

the fruit was very dark red, she tested lycopene content and found ten times the amount in most commercial tomatoes.

Ishida and her colleagues are looking for the genes activated to increase lycopene production. Then they hope to activate the genes in commercial varieties.

Tomato News

Feb. 2000



Tomato Harvester

POMAC S.r.l., world leader in tomato harvesters, is proud to present the latest additions to its production range: COSMO/SA, COSMO/SA/DS, COSMO/SR and COSMO/SR/DS. These machines are four mobile tomato harvesters assembled on a common base.

Either the alternating belt shakers (COSMO/SA) or the vibrating-spike shakers (COSMO/SR) can be installed on the same base.

These two harvesters come standard-equipped with a 30-channel fast tomato sorter (67m/mn), Model PLUS-COLOR 300K, manufactured by STEI S.r.l. A double sorter can also be installed on the same machine (COSMO/SA/DS and COSMO/SR/DS).

The main features that distinguish the COSMO/SA, COSMO/SA/DS, COSMO/SR, COSMO/SR/DS line include the dual automatic-levelling system (units installed on both the machine and the sorting belt), the removable 10-function control stick, the rear belt for leaf and waste runoff, the hydraulically adjustable harvesting

wheel, the individually removable moving fingers (their speed being independent from the four-position cutting bar), the hydraulically adjustable conveyor, the control of all moving parts from the driver's seat, and a harvesting capacity of 20 to 30 tons/hour, depending on the model.

The rational mechanical and hydraulic design and the installation of top-quality components ensure the long-term reliability of these cutting-edge harvesters.

For further information:

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Tomato News Feb. 2000



"No Fuss" Product offers consumers Eggs in a Bottle

A product which offers consumers a convenient way to use eggs with "no mess, no fuss and no shells" has been launched by Deans Food Group, under the brand name Goldenlay.

The British product, called Ready Egg, was launched at the BBC Good Food Show in Birmingham, English Midlands, where chefs and home economists demonstrated just how easy it was to use.

Ready Egg contains pure fresh eggs with all the flavour and nutrients

associated with standard eggs. It is ideal for all cooking purposes and can be used whenever whole eggs are required.

Ready Egg is suitable for home freezing and each bottle contains the equivalent of five medium or four large eggs. There are detailed measurement instructions and recipe collars on each bottle. It is the first product of its type on the market for use by the general public.

Ready Egg is available as a convenient economical and versatile way of using fresh whole eggs. The fact that the egg is pasteurised, means it is convenient and safe for all the family. The bottle should be stored in a refrigerator and, once opened, used within three days.

Barry Vigus, development director at Deans Food Group said: "We are a well-respected and established company who offer consumers fresh, innovative and quality products to assist them in their busy everyday lifestyles."

"We have researched and undertaken consumer trials and developed Ready Egg to answer the problems associated with a fragile food in our busy lives." Ready Egg will be available in supermarkets across the United Kingdom this year.

Sarah Lumley, The Communications Initiative, Thornton House, Thornton Road, London, United Kingdom, SW19 4NG, Tel: +44 181 946 7845

LPS This week in Britain 8.2.2000



'More focus on food preservation urgent'

Blessed with arable land and varied agroclimatic conditions, India can provide the \$20-billion processed food sector manifold possibilities of growth only if the infrastructural hurdles and postharvesting technologies are given the right impetus.

Although India has always had the natural advantage in terms of food production which facilitates all kinds of processing the introduction of high quality food products such as extruded food, beverages, frozen products has created a high level of demand from the local consumers.

According to a report by McKinsey and Co on the prospects of the food processing industry, "not only has India a natural advantage in the industry, its growth and development has impact like no other in terms of stimulating the economy and raising living standards. And what is assuming new importance is the impact of higher incomes on food consumption patterns". But to realise the export and local potential of the industry which is expected to treble in the opening years of the new century, many infrastructural bottlenecks need to be removed.

Experts say that till they are removed, the industry will be termed a 'sunrise' industry only on paper.

"The Government in all fora refers to the industry as a sunrise industry but much has to be done to realise its potential," says Mr. Vijay Sardana, Secretary, Confederation of Indian Food Trade and Industry (CIFTI). The

Government is spending Rs. 15,000 crores every year on crop preservation which includes seeds, fertilisers, pesticides etc., but when it comes to the post harvesting scenario, there is not a single document on it. The focus has to shift to food preservation which would in turn lead to successful processing, says Mr. Sardana.

Besides making agro-processing an integral part of the agricultural policy, there has to be a separate budgetary allocation for post-harvesting techniques, experts state.

"It is at the source of food production that we need the requisite infrastructure like cold chains, effective transportation, grading stations, if food has to be conserved to be converted into pickles, jams, juices and other semi-cooked food," says the secretary.

But the Government is not ready to spend in these areas. Investment in cold chains in local areas is absolutely must and farmers have to

be trained to effectively contain wastage of national produce, Mr. Sardana states. But all channels of preservation and processing are being ignored, say experts.

The Government on its part accepts the limitations but states that many policies have also been introduced to give impetus to the industry.

"We have accepted the fact that Indian food processing activity is still largely based on primary processing which accounts for almost 80 per cent of the value-addition, but as globally processed food intake increases, it would demand moving in more sophisticated secondary and tertiary processing," says an official of the Food Processing Ministry.

There is a demand for sophisticated technology and more investment to propel the industry. But we have declared the industry as a high priority area in the policy which gives automatic approval up to 51 per cent of equity of foreign investors, he says.

Experts on their part state that the mere policy decisions would not work and the Government has to look into problems at the rural level in terms of storage, preservation and transportation.

"Indian processed food, especially that originating from fruits and vegetables, has a tremendous potential but farmers are still unaware about the kind of fruits which have an international market and their potential," says Dr. K. L. Chaddha, an agricultural scientist.

Most of the farmers do not have access to cold chains which charges high rental fees. Moreover, they are unaware of simple conservation methods such as that fruits have to be removed of fluid heat and dehydrated if they have to be preserved. This has led to a lot of horticultural waste which can easily be contained, says Dr. Chaddha.

Business Line

29.2.2000



INDUSTRY NEWS

Sweeteners for a more pleasant flavour

The Talin Food Company, a division of Hays Ingredients Ltd., has developed a new tabletop sweetener used to mask the bitterness of sweeteners, rather than used as a sweetener itself.

At levels of 5 to 50 ppm, Talin has been found to be a very powerful masking agent, thereby improving palatability. It works by masking processing flavours and bases; the components of flavour breakdown therefore extending shelf life of products; the bitter or metallic notes associated with intense sweeteners; and aftertaste due to its longevity of sweetness profile. In addition, it reduces the bitterness from caffeine or plain chocolate, and astringency in stocks and soups.

Talin is the registered trademark of Thaumatin, the world's sweetest natural substance. It is regarded as a natural flavouring ingredient that has the unique ability to interact with all areas of the tongue and achieve a variety of functions within a flavour system. It has the ability to work across both sweet and savoury flavours as well as in the testing area of pharmaceutical.

Other areas where Talin has recently been found to have very beneficial effects are in Lemon drinks. During storage, these drinks often undergo a deterioration of

the flavour due to the breakdown of flavour components and artificial sweeteners. Talin can help to mask these unpleasant taints and improve the flavour generally.

Other applications include how calorie hot chocolate drinks and flavoured water where the ingredient can improve the mouthfeel and flavour.

Asia Pacific Food Industry October 99



Improve ice cream flavours with pure vanilla

Nielsen-Massey Vanillas Inc. has developed pure vanilla extracts to enhance the flavours of ice creams. Other than vanilla, the new extracts can be applied to any ice cream flavours, from chocolate to strawberry, or even Rocky Road to Double Fudge Ripple, Butter Pecan and Cherry Cheesecake.

The company's creamy, sweet, rich and mellow flavour of the Pure Madagascar Bourbon pure vanilla is a perfect marriage with any ice cream flavour, while the Tahitian vanilla offers fruity, cherry, almond-like notes that compliment fruit flavoured ice creams. Indonesian vanilla, with its pyrazine-like notes is an excellent potentiator for coffee ice creams. In chocolate ice creams, pure vanilla extracts can bring out the depth of the chocolate - giving it a richer,

deeper chocolate taste in chocolate flavoured ice creams.

Blends can be customised to fit specific product needs. Also available is the 100 percent certified organic Madagascar Bourbon pure vanilla extract. Extracts are available for retail sales in four - and eight-ounce bottles, and in quart and gallon sizes for the food service industry.

Asia Pacific Food Industry October 99



Tropical Superfex® flavours for hard candies and jellies

Virginia Dare has further expanded its line of Superfex® brand confectionery flavours, a product line designed specifically to meet today's taste preferences for a host of confectionery and bakery applications. The new tropical flavours, or Tropical Superfex, include Carambola, Chirimoya, coconut, guava, jackfruit, mango, passion fruit and pineapple.

The starting use rate for Superfex products is 0.10 percent in hard candies, 0.05 percent in pectin or starch cast confections, (e.g. nougat, caramels, jelly or soft centred candies) and 0.05 percent to 0.075 percent for bakery fillings, icings, frostings and toppings.

A range of new frozen dessert flavours has also been developed by the company. This range of

products is lined up for this month's Worldwide Food Expo to be held at the McCormick Place, Chicago between 28 and 31 October.

Other flavours from the company include Honeydew Isotonic 'Replenishment' flavour system developed specifically for drinks made in the increasingly popular granitas machines and Fuzzy Mango Lemonade and Strawberry-Kiwi Green Tea for still drinks.

Asia Pacific Food Industry October 99



HLL succumbing to Indian aroma; eying MDH Masala

In an effort to make foray into the spice sector, fast moving consuming goods (FMCG) heavyweight Hindustan Lever Ltd (HLL) is negotiating with Delhi-based MDH Ltd to acquire the MDH Masala brand.

After making a successful entry into various branded packaged segments, this will be HLL's first foray into branded packaged spices which has remained untouched by HLL so far.

HLL neither confirmed nor denied the acquisition of the MDH Masala brand. The HLL official spokesman told this newspaper that "we will not confirm nor deny this matter because this is a price-sensitive information. Whenever, this acquisition happens, the company will inform the stock

exchanges".

When contacted, MDH Ltd general manager Surjeet Singh said that "I cannot comment on the issue." He, however, also did not deny the move altogether.

He refused to divulge the turnover of the company, saying "since it is a limited company, we are not obliged to declare the financial figures."

According to market sources, the talks between the two were on and final decision in this regard would take time as the due diligence of MDH Ltd was still to be done by HLL.

The amount of the acquisition would also be finalised once the due diligence was over. The due diligence would be done internally by HLL and the company had not appointed any external agency for the deal, the sources added.

The Observer 18-01-2000



Hind Lever rolls out chappatis

Anglo Dutch foods and detergents major Hindustan Lever has finally made its debut in the convenience foods arena. It has rolled out a packaged product branded "Annapurna Chappatis" in Mumbai.

This comes close on the heels of HLL's 74 per cent stake in Modern Foods for Rs 105 crore. HLL will leverage Modern's distribution chain to sell the product.

The ready-to-eat product is currently being test-marketed in the city. The pack of ten carries a Rs 15 retail tag.

The product is part of the Kissan Annapurna range which already sells salt and atta. The chappatis were first air-dropped in Orissa last year. It was part of the aid programme for the cyclone-ravaged state.

A commodity brand, HLL introduced Annapurna salt in the mid-nineties. There are plans to introduce various spices and cooking ingredients under this umbrella.

HLL's packaged foray comes at a time, when competitor Britannia, too, is shoring up its portfolio to include packaged foods. Britannia is said to be working on a range of breakfast items.

HLL earmarks Rs 20 cr for tech-upgradation.

Meanwhile, the FMCG major would utilise the proposed Rs 20 crore fresh capital infusion to upgrade manufacturing units and enhance the Modern brand, a top company official told PTI.

"We would use the Rs 20 crore equity capital to restart Modern Foods by way of upgrading technology and further strengthening the Modern brand," HLL's head of foods division Gunender Kapur told PTI after signing the shareholders' agreement with the government in New Delhi.

Business Standard 02-02-2000



Concept Foods plans Rs 10 cr expansion into fruit chips

The Rs 2.5 crore Hyderabad based Concept Foods Pvt Ltd is currently in talks with a Japanese food technology major for expansion into fruit chips. The process of negotiations with the Japanese company is in an advanced stage.

The company will be making an additional investment to the tune of Rs 10 crore for this technology. Set up in 1993 by the former managing director of Dr Reddy's Laboratories, M P Chary, Concept Foods is engaged in the business of innovative food products.

T K Bhoopathy, managing director, said that they expect to finalise the deal by the end of February 2000. Once the deal is signed, the project will be commissioned immediately. "A tie-up with this Japanese company to bring the technology to the country for manufacturing fruit chips (vacuum fried chips) will be another step in our expansion into the innovative foods market. With this technology, we will be able to make chips out of fruits like apple and other fruits. We would be the first company to introduce fruit chips in India if this deal works out," he said.

Concept Foods is also contemplating to offer equity holding to the Japanese partner and thereby expand the equity base. It is looking at broadening the equity holding of the company in the next few months after the collaboration. It has also received enquiries from venture capitalists

and private equity funds, he said. "We have been receiving several enquiries from parties interested in investing in our company, but at the moment we are not looking for investments from venture capitalists or any other private equity financing," said Mr Bhoopathy. The company's earlier foreign tie-ups were with Norwest of France for fruit bars and with the US-based Knetchel Lab for E2 cereal bars, which they have recently launched in Mumbai after its initial launches in Hyderabad and Delhi.

"This is a new category which we have created in the convenience food market and we see no direct competition. In terms of turnover from this product, we have already clocked a turnover of Rs 1 crore in the last four months ever since it was launched in Delhi and Hyderabad and by 2000-2001, we are expecting the turnover from this brand alone should be close to Rs 5 crore," affirmed Mr. Bhoopathy.

The Observer 03-02-2000



MTR to enter 'ready-to-eat' food market

The Banagalore-based MTR Fast Foods Ltd is poised to enter the 'ready-to-eat' food segment in April 2000, a precursor to the 75-year-old group's plans to float a public issue next fiscal.

"We will be relying on the German Retort technology for our entry into the 'ready-to-eat' food is sterilised (using both steam and

pressure) inside a four-layered lamination pouch and it will have a shelf-life of two years," Mr. P. Sadananda Maiya, Chairman & Managing Director, MTR Fast Foods, told *Business Line*.

Mr. Maiya refused to divulge the investment behind new technology. However, the Rs. 39 crore MTR will go public next fiscal, he added.

"We hope to close this fiscal at about Rs. 48 crores, registering a 25 per cent annual growth. We hope to maintain this growth rate by tapping wider markets at home and by strengthening our presence in the export market," Mr. Maiya said.

Along with its impending foray into the 'ready-to-eat' segment, MTR will also eye the North Indian fast food market in a big way. "We will be getting into the North Indian flavours with Retort technology," Mr. Maiya said. "In fact, we have already set up our presence in Delhi, Ahmedabad, Baroda, Surat, Pune and three cities in Uttar Pradesh, including Noida. We want to spread our presence nationwide, except in the north-east," he added.

MTR currently rules strong in the 'ready-to-cook' South Indian food industry. "In Karnataka, Tamil Nadu and Andhra Pradesh, we have more than 590 stockists," Mr. Maiya said.

MTR's main strength lies in instant mixes, vermicelli and pickles. The group also entered the Softy ice-cream business about six

months back.

Mr. Maiya said MTR's ready-to-eat pouches (of south Indian foods such as *bisibele bhat*, *pongal* and *upma*) will help the business establish further among the Indian diaspora.

"We see a good export market besides tapping those Indians who are on the move outside the country. All they need to do is put the laminated pouch in boiling water for 10 minutes before it is ready-to-eat," he said.

At present, the income from overseas markets like US, UK, Singapore, Malaysia, Dubai and Germany accounts for Just Rs. 3 crores.

Mavalli Tiffin Rooms (MTR) entered the business of instant food mixes in 1976 after they were forced to temporarily close the restaurant business during the Emergency. MTR started marketing the instant mixes in 1983, before extending its presence to Tamil Nadu and Andhra in 1985.

Business Line 03-02-2000



Amul plans range of products

In an aggressive move to take on competition from brands like Britannia and Le Bon in the dairy market, the Gujarat Co-operative Milk Marketing Federation (GCMMF) has lined up a slew of launches under its brand, Amul.

While it has already launched

curd in the major metros, and relaunched Amul milk in the country last month, plans are to double market share in the condensed milk market and expand its ice cream network from 250 outlets to 350 outlets.

GCMMF managing director BM Vyas told ET there were plans to enter the flavored milk segment in the near future. "Our aim is primarily to offer products at a fair price to the Indian consumer. Through price, distribution and quality, the Amul brand is being equipped to edge out any competition in the Indian dairy market," he said. It has launched varieties of Amul cheese, Amul Mithais and Amul Paneer.

GCMMF claims to be the first foods company to start a cyber-store in the country. "We have already got a loyal customer base of 40,000-50,000, spread over 80 cities. For a minimum order placed of over Rs 200, the products will be delivered at no extra cost the very next day," Mr Vyas said. GCMMF has about 3,700 wholesale dealers with a reach of about 500,000 retailers.

Meanwhile, the organisation has also undertaken supply chain initiatives and computerisation of its dealer network.

"The supply structure from producer to processor and marketer to consumer is being simplified to ensure a faster supply chain system. Our ace will be providing a better quality, fresher product at a price which leaves our competitors far behind," Mr Vas said.

The Company has organised its dealers into quality circles to work in tandem with its sales force. A Total Quality Movement has been started to improve product quality, reduce production costs and improve the efficiency and effectiveness of milk procurement.

Economic Times 04-02-2000



Himalaya may sell 11% stake

Delhi-based food processing company, Himalaya International is considering offloading another 11 per cent stake to US based food company, Mushroom Associates. HIL is a 100 per cent EOU with interests in mushroom cultivation and processing.

Mushroom Associates has already taken a 11 per cent stake in the company last month for a total consideration of around Rs 1.25 crore, Rajan Dhawan, Director (finance), HIL told ET.

Part of the stake was picked up by Goodwin Refrigeration, a subsidiary of Mushroom Associates. The shares were picked up at the rate of Rs 11 per share, Mr Dhawan said.

HIL, which floated a 100 per cent subsidiary in the US two months back, is also getting into the IT sector. As a part of this plan, it is setting up a food portal, which would carry out an entire range of B2B transactions in the food sector. "This would ensure that food companies and vendors would both have to go through the commodity and hedging market

only for transacting in food products", Mr Dhawan said. The company has registered E Foodlink as one of its names for the site in the US.

The details of the second equity sale to Mushroom Associates would be finalised next month. "We are waiting for the anti dumping review of the US government later this month, which would enable us to finalise our expansion plans", Mr Dhawan said and added that part of the funds from the next tranche of equity sale would be either employed for financing the company's expansion plan or to repay part of a high cost loan from IDBI. Internal accruals would also be used for the expansion plan.

HIL is planning to expand its capacity from 1,500 tonnes per annum to 3,000 tonnes per annum. Apart from mushrooms, the company is also planning to do other crops like baby potatoes, which have found favour in the western market.

It has recently bagged a Rs 2 crore order from a US company to supply baby potatoes.

It is also planning to prepay Rs 10 crore IDBI loan, taken a few years ago at a high interest rate of 20 per cent, with part of the sale proceeds.

Economic Times 8-02-2000



Tropicana aims for slice of Indian market

Tropicana, a unit of PepsiCo Inc. is scenting big business from its

juice brands in India with the country's middle class becoming more health conscious, according to a senior company official.

"Up to now, Tropicana's sales in India are about Rs. 10 crores (\$2.29 millions). We estimate revenues will grow to Rs. 100 crores by 2002-2003," the Tropicana Country Manager, Mr. Abhay Manglik, said in an interview.

"I think there is a gradual movement - especially in the urban areas - where people are becoming more health conscious and concerned about what they eat. The market for juices is imminently poised for an explosion," he said.

He said the company saw enormous potential in the Indian packaged pure fruit juice market which is currently estimated at about Rs. 120 crores. A number of fruit drinks, distinct from pure fruit juice brands, are also available in the Indian market.

Tropicana imports frozen fresh juice concentrate from overseas, adds distilled water to it at a plant in Maharashtra and sells the juice in packaged form.

Rival Indian pure juice brands such as Onjus and Dabur India Ltd.'s Real have already carved out a sizable presence in the Indian market.

But Tropicana feels there is enough room in the market for another player. "I think there is immense potential for two to three players," said Mr. Manglik. He said growth in the packaged juice market could

be at the expense of other drinks.

"It could be partly at the cost of other beverages - liquor, cola, water."

Business line

13.02.2000



Modular seeks partner for food processing project

Modular Consultants, promoters for the country's first integrated food processing park coming up at Dankuni, West Bengal, are scouting for strategic financial partner for the Rs. 204 crore project. The project is expected to attract a total investment of Rs.2,000 crore.

The project is expected to be executed in multiple phases. While Rs. 96 crore will be deployed in the subsequent phases. The promoters have tied up with Eco-Vision Inc of Canada for the research and development centre, Frozen Foods Ltd. (a subsidiary of Mitsubishi Corporation, Japan) for the cold storage and Romtech of Australia for master control centre.

The project has recently been sanctioned Rs. 15 crore from Hudco, along with Central government grant of Rs. 3 crore approved and partly disbursed for infrastructure development.

Snowman, a joint venture between HLL, Mitsubishi and Amalgam for development of cold storage unit has been allotted a plot within the park, and construction work is under way.

The rationale behind setting

up this park, say senior official sources, is that West Bengal produces 27 per cent of the pineapples, 28 per cent of potatoes and 17 per cent of the rice production in the country.

"Food processing is a sunrise industry and a vast potential lies untapped. It is yet to realise its full potential", said a government official.

Some factors restricting the sector's growth are fragmented production centres, and absence of any effective intermediary agency such as producers' cooperatives. Cold chain infrastructure required for transportation and storage also needs major augmentation.

The proposed food park will provide basic infrastructure facilities like cold storage, generate necessary volumes for direct marketing, thus eliminating multiple intermediary stages. The complete project shall be in 530 acres of land, out of which 70 acres have already been purchased.

Business Standard 15-02-2000



Danish food processing giant plans to set up unit in India

The \$4 billion Danish processed food conglomerate Danisco AS is planning to set up its second plant in India with an approximate investment of Rs 5 crore within the next five years.

Speaking to *The Financial Express* in an exclusive interview on the occasion of the launch of its first plant based in Haryana.

executive vice-president Robert H Mayer of the company said, "Given the high growth potential of the packaged food items in India and with the country's consumers finding less and less of disposable time we plan to take on the Rs-800 crore Indian ingredients market in a big way".

Coca Cola and Pepsico were very much involved with the company in the international market. However, for Indian operations the companies had yet to develop an association.

The first plant by the company located at Sohna. Haryana has been established with an investment of Rs 5 crores.

The Danish multinational operates in India under the name of Danisco Ingredients India Pvt. Ltd and has a 74:26 joint venture with Shiv Jatia, the Indian promoter of the Asian Hotel group.

On the occasion of the launch of its first unit located in Haryana, managing director Neil Prasad said, "the company plans to launch as many as 400 flavours as well as export many of the flavours based on Indian recipes as they were in great demand in the European markets."

The company will also be providing complete food processing solutions to local food processing clients who have the know-how to cater to the domestic tastes and preferences.

Responding to specific queries, Neil said that in the wake of the fears of the wiping out of the

domestic food companies with the removal of protection as wanted by the WTO, he said that his company was interested in helping medium-sized companies to overcome the bottlenecks, "We would not mind going out to assist companies to find their niche areas," he said.

The company also plans to export flavours, ingredients, soft drink flavours in the neighbouring markets like Nepal, Sri Lanka, Bhutan, Bangladesh and Maldives.

"We find the Indian market very different from that in Europe. In the sense that in the country apart from the large international producers there are a large number of medium-sized producers," said Ferderick Gejl-Hansen, executive director of Danisco Cultor Denmark.

He further said that Danisco would therefore target a range of players from the medium to the large sectors, including multinationals like Nestle as well as Unilever.

Despite India having the largest food processing sector only 25 per cent of the food products undergo industrial processing, said company officials. However, this is expected to be amongst the world's five leading food producers within next five to seven years time.

Financial Express 16.02.2000



Nestle set to foray into treated-milk segment

Nestle India has finalised plans to enter ultra-heat treated milk

segment before June this year and bottled mineral water a couple of months later.

Nestle India managing director Carlo MV Donati told The Financial Express that UHT milk would be launched in the first half of the year and bottled water a few months later. The bottled water would be marketed under the newly developed brand "Pure Life."

Donati added the Rs 1,6000-crore company was setting up a plant in Samalkha, Haryana, for its water business.

The water and milk foray had been on the anvil almost a year now. Donati had first disclosed the company's plans to enter these two potentially high growth segments mid-1999. Later in the year, senior company officials told a group of analysts that it was making forays into mineral water and packaged milk. It is now clear that the company is entering the UHT milk and mineral water business.

While UHT milk market is a relatively new category at present with about two players, the bottled mineral water market has witnessed explosive growth in the last few years with new brands coming into the market every few months. He added the expense of setting up the new plant would be financed through a combination of internal accruals and borrowings.

Financial Express 21.02.2000



Frito-lay chips in with new plant

Frito-Lay India, PepsiCo's snack food arm, proposes to launch four to five flavours of chips each year. Towards this, it is increasing capacity by putting up a 3,000 tpa chips plant in Western India. It now has a 4,000 tpa unit in Punjab. Frito-Lay is "trying to launch at least one new variant every quarter," said Mr. Manu Anand, the company's Managing Director.

The Rs. 100-crore company found the going tough in the initial years, but managed to turn around once it was able to understand the Indian palate. The last five years have proved good, according to company executives, and it has since grown at 40 per cent annually.

With about 65-75 per cent share of the chips market, Frito-Lay's portfolio comprises three categories - Lay (Potato chips), Lehar Namkeens (salty snacks) and innovation products such as Lehar Kurkure. Lay Max is the latest flavour in shops catering to teenagers with its 16-g pack.

Lay's potato chips are available in four variants - Classic Salted, Magic Masala, Saucy Ketchup and Pudina Punch. Cheetos has three variants - Tomato Wheels, Masala Balls and Masala Cheese puffs.

Potato chips, however, are the company's flagship product, and it has contract farming and buy-back agreements with potato farmers in Punjab.

Lehar Namkeen, according to the company, is second only to Haldiram in the branded salties segment. The company is also looking at the export market, with a proposal to export Namkeen to West Asia next month. This will be followed by a focus on other countries with large Indian expat populations.

With a recent market research study showing that 97 per cent of Indians consume at least one common snack daily, Frito Lay is tailoring its products to suit the Indian palate, said Mr. Anand.

To keep abreast of the market the company runs frequent blind checks on products, and works on improvements. It is competitively priced, with a 40-g potato chips pack costing Rs. 10 while a 30-g Uncle Chipps pack is priced the same.

The size of the domestic snacks industry is about three lakh tpa. most of it in the unorganised sector, making it the 12th largest in the world. Britannia Industries Ltd is among latest entrants into the segment.

Business Line 24.02.2000



Spicy moves: Mahaan to extend brand from pickles and chutneys to spices

Innovative packaging will be the USP of the 100-g packs

The Delhi-based Mahaan Food Ltd-part of the Rs 205-crore Mahaan Group plans to expand its processed food portfolio by

launching formulated spice blends, this year. The company made a foray into the processed food market last year by launching pickles and chutneys under the brand name Mahaan Tastemaker.

To be launched under the same brand name and in 100-g packs, Mahaan's spices will be test marketed in August and later followed up by a formal launch in October. According to the managing director Rajiv Goyal, Mahaan's spices will be competitively priced against other brands such as MDH, Everest and others. The USP of Mahaan spices will be its packaging which will be unique and innovative in the category according to Goyal, who refuses to divulge more details.

The company has targeted a sales turnover of Rs 5 crore to be achieved by the year 2003. For this, the company is setting up a new plant near its existing facility in Pontasahib with an investment of Rs 2 crore. The plant, claims the company, is one of the few to have the cold grinding technology which ensures retention of original aroma of spices.

In the current fiscal, the company also plans to aggressively market its other food products such as pickles and chutneys. Launched last year, Mahaan plans to spend about Rs 2 crore on advertising the foods brand this year.

The other Group companies include Mahaan Dairy Ltd and Mahaan Proteins Ltd which manufacture ghee and milk proteins respectively.

So far entrenched in the North. East and North East. Mahaan is slowly moving to other regions as well. This year, it plans to reach out to Maharashtra, Gujarat, Orissa and Bihar. For rural penetration, the company has launched a smaller SKU-a 200-ml pack of Mahaan ghee priced at Rs 35/40 about six months ago.

Financial Express 25.02.2000



Heinz Takes 5 Yrs to launch leading ketchup brand

Five years after \$10-billion US-based consumer goods giant H J Heinz Co entered India through the acquisition of Glaxo's consumer brands business (Farex, Complan and Glucon-D), the Pittsburg-based company is ready to launch the first Heinz brand.

In an exclusive interview with ET, Bill Johnson, president and CEO of H J Heinz, confirmed that their Indian affiliate would soon be formally launching the company's flagship Heinz ketchup brand in India.

Five years might seem rather long to launch your main product, but Johnson robustly defends the track record of his Indian company. Just because Heinz brands haven't been launched doesn't mean the company has been dormant, he says. "In the past five years we have been growing our local brands by 20-25%, and we have been building up the infrastructure needed to launch our other brands. I'm very pleased with the performance of our team in India.

I wish I had 50 like them."

Pradeep Poddar, managing director of Heniz India Private Ltd, points out that making ketchup isn't easy. Real ketchup that is. "I would hardly call the products currently available in the market ketchup," he says dismissing the Kissans and Maggis we are all familiar with. He explains that the current local brands are packed with preservatives and flavourings, and artificially thickened with substances like starch.

Heinz however prides itself on its entirely natural product. No additives, with flavour and thickness, all derived directly from using the right tomatoes. Heinz has its own variety of tomato, and the Indian company first had to find farmers willing to grow it - the main reason why the launch has taken so long. "Consumers will immediately be able to taste the difference," says Poddar.

The action isn't just with the global brands. Johnson says where the company has bought into well established local brands, it strongly believes in growing them. "Even when Heinz has a brand in the category, we don't kill off the local brand," he says, "In Indonesia, for example, we bought a well-known local ketchup, and we have kept the brand, while bringing in Heinz at the premium end. That way we have the market covered."

Heinz has hence grown Farex and Complan, by launching several variations of both. It has also extended the Complan brand into other forms, like biscuits (following

in the footsteps of Kellogg's and Horlicks, though Poddar denies copying the tactic). Johnson says that the company sees particular potential in Complan which fits neatly into natural health and organic foods, a category that the company is putting particular focus on. "We may even be exporting Complan to other countries," says Poddar.

Other important Heinz Categories like pet foods, weight reduction products, and frozen foods, may not be relevant today, but Poddar doesn't rule out launching them over time. "There is so much potential over time." For now though he says the company will focus on delivering value.

Economic Times 28.2.2000



Berri to quench summer thirst with range of juices

The sun-kissed orange, apricot nectar, exotic combinations of black currant and apple, lime/raspberry, orange and mango juices are bound to cool stomach, tongue and set homes, offices tingling. The 100 per cent finest fruit juices from Berri Ltd are here to quench your summer thirsty. Courtesy: Adluri Foods. The world famous Australian Berri juices have been launched in Hyderabad by Adluri Foods.

"Customers now have a better choice to move away from artificial flavour/colour to original fruit juices," said A V Bhaskar, chief executive officer, Adluri Foods, which directly import the products

from Berri.

He said, Berri juices contain no added sugar, no preservatives, no artificial colours and are packed in clear PET bottles. Advanced packing technology ensures a long, stable shelf life, he said. According to him, all Berri products carry stringent food regulations and are manufactured in best practices. Instead of usual carbon dioxide drinks one can serve the goodness of natural, exotic fruit juices, claims Bhaskar.

Rob Buchel, market development manager, Berri Ltd, Australia, said with the quality, R&D technology and new innovations Berri juices can become number 1 in India in a few years time. Berri, which holds 70 per cent market share in S-E Asia, may not find it difficult to market in India. "India has a wonderful market for fruit juices," Buchel said adding Berri is adopting pasteurisation method, a very costly affair, to preserve juices for a longer period.

Financial Express 4.3.2000



Marico test markets Sil jams in sachets to push volume growth

Marico Industries is test marketing Sil packs of Rs. 2 per sachet - a move which is expected to induce volumes in a sector suffering from a degrowth.

Marico's strategy aims at marking a presence in multiple price points which is also a strategy adopted by Hindustan Lever (HLL) whose Kissan 'chhota jammy' pack is said to have

spurred consumption, especially on the back of the promotional campaign featuring cricketer Rahul Dravid.

The Kissan small sachet pack, also priced at Rs 2, was launched last year backed by the "chhota jammy" campaign. According to Marico Industries CEO (healthcare division) Pranab Datta: "The Sil sachet has been test launched in the south.

The company would first study the consumer response and then plan to launch the sachets in certain pockets of the eastern region." The price points in which Sil jams currently exist in the market place are 500 gm jar priced at Rs 46.50, 270 gm jar priced at Rs 28.50 and a 100 gm mixed fruit jam jar priced at Rs 11.75. The sachet of Rs 2 would cover more or less all price points for the company. Sil, which was relaunched over a year back, has a market share of 15 per cent in the Rs 50-60 crore market where the total volumes are 600-700 tonne per month. Kissan leads in the category and commands a market share of 66 per cent.

Prior to the relaunch, Sil's share was under 10 per cent. The relaunch involved enhancement of appeal and convenience along with a change in the packaging design for the entire range. new formulations including jams with glucose have also been introduced in the market. The brand registered a 3 per cent growth in value during 1998-99. Marico's move of test marketing Sil jam in sachets comes in the wake of an excise duty hike on jams from 8 per cent to 16 per cent in the budget. The hike in excise levels is expected to

lead to increased price levels at a time when the sector is suffering from a degrowth. Jams were brought in the excise net at an 8 per cent duty level in the Budget of 1999-2000.

This has led to a degrowth in the jams market following upward price revisions, say industry observers. The industry feels that a further increase in the excise level to 16 per cent this budget, could sound a deathknell for the sector.

The launch of jams in sachets can, however, save the day presumably with consumers continuing to purchase jams as part of their regular food habits at a Rs 2 price level, point out industry analysts.

Financial Express 7.3.2000



Frito-Lay plans to set up a Rs 25-cr plant near Pune

Frito-Lay, the snack food company of New York-based Pepsi group is planning to set up its second manufacturing plant in India.

According to sources, the company will invest Rs 25 crore in setting up the new plant at Ranjangaon, new Pune. Frito-Lay, has three brands - Lays, Cheetos and Lehar.

The new plant will have a capacity of 3,000 tonne per annum. With this new plant, the company's total capacity will go up to 7,000 tonne per annum, sources said.

The second plant was necessary to offset the high freight element involved for marketing the product in the south and the west. A truck carrying 10 tonne of any other commodity can carry only one

tonne of chips, thereby, increasing the freight cost considerably. This is because the nitrogen flushed packets take more space, Sources claim that the company has a 65 per cent market share in the branded potato chips market, while Lehar has a market share of 15 per cent in the branded namkeen market.

At present, Frito-Lay's only manufacturing plant is based at Sangrur in Punjab. Lehar namkeen is manufactured at a facility in Faridabad. The turnover of the company is around Rs 100 crore.

Pepsi Foods runs a major potato research and extension programme in Punjab, from which the potato chips are manufactured by Frito-Lay. Pepsi, sells the sapplings to farmers, who sell their potatoes to the snack food company.

Economic Times 18.3.2000



Dabur to add flavour to Hommade

Dabur Foods Ltd. part of the ayurveda and healthcare major Dabur India, plans to add two new 'exotic' flavours to its 'Real' packaged fruit juices in the current year. It also plans to extend its Hommade cooking paste range to other categories such as - pickles, pappads and spices, said company sources. The focus this year will be on Hommade, because the company needs to consolidate Real and Hommade brands. The new flavours to be introduced in Real will be grapes and black currant. At present, Real is available in six flavours - orange, pineapple, mango, tomato, apple and mixed.

The company is also considering some changes in the packaging of the Real brand. Real

is currently available in tetrapacks. The company is currently conducting research for new advertising for the Real brand. The brand was relaunched with new bottle cap packaging two years ago and today claims 50 per cent market share of the packaged fruit juice market, with Pepsico's Tropicana at 25 per cent and Enday Texafoods' Onjus at 20 per cent. In the current fiscal, Dabur aims to capture about 6-65 per cent market share.

The company has decided to take 5-10 per cent increase in Real prices - to be effective from April 1, 2000-following an increase in excise to 16 per cent as proposed in the Union Budget for 2000-01. At present, Real is priced at Rs 48-60 for 1 litre; Rs 25-30 for 500-ml; and Rs 10-12 for 250-ml added the sources.

Central Chronicle-Bhopal 22.3.00



Heinz paints the ketchup market red

Heinz India, the Indian affiliate of the \$10 billion HJ Heinz group, has launched its icon brand, Heinz Tomato Ketchup, in India. The company claims that Heinz Ketchup is a pure and natural ketchup with no artificial preservatives.

Priced at Rs 30 per 200 ml bottle and Rs 65 for a 500 ml bottle, the ketchup has been rolled out in Mumbai, Delhi, Calcutta and Chennai. Heinz has been in India for the past five years and has category leadership with its other brands such as Complian, Glucor D, Farex and Nycil, which were acquired by Heinz from Flaxo globally.

Financial Express 22.3.2000



APEDA NEWS*

* Extracts reprinted from Apex Update, January 2000

Proposal for Banner Hosting by Exporters of APEDA Web site

This is to inform that APEDA has already established its web site www.apedaweb.nic.com and is in the process of enriching the same with useful, latest agro based information in order to facilitate the trade community. APEDA is attempting hard to reach to a stage to be acknowledged as a model web site which would have useful online information over export statistics, registered exporters, trade fairs and trade enquiries, status of financial assistance application, pesticide residue limits, and other information like market prices of various commodities, notification and regulations to name a few for the agricultural and processed food industry. Further, not only to have a close knit family of APEDA members at its web site but also to bridge the gap between exporters and importers, APEDA has decided to pass on the benefits of information technology to its member exporters by following ways:-

To provide individual mail boxes to APEDA registered exporters.

To provide live chat room for online interaction facilities, bulletin board service and auto forwarding of trade enquiries.

- c) To provide strategic link exchanges with trade associations and other web sites of the agro industry.
- d) To launch a banner campaign on selected hot web sites.
- e) To introduce the concept of E-commerce using Internet tools.
- f) To devise the ways for attracting the relevant target audience to the APEDA web site.

For the benefit of member exporters, APEDA has decided to give the opportunity to the exporters to come forward for hosting their banners at APEDA web site. This would publicise the exporters globally through the potential media of internet. With this objective and to meet the running cost of the web site APEDA proposes to charge a concessional rate for designing and hosting of banner.

Exporters who wish to get Banners created and hosted at APEDA, may contact : M/s. Sky Web India Private Ltd. C-49, Sector 11, Noida, Phones ; 91-537212/13/14/15.



Installation of semi commercial Vapour Heat Treatment (VHT) equipment for quarantine standardisation at APMC, Vashi, Navi Mumbai.

APEDA has obtained an 1.5 tonne capacity VHT machine from M/s. Sansui Sangyo Co. We are conducting large scale VHT test and evaluating their data in relation to export of fresh mangoes from India to Japan, USA, Australia & New Zealand etc., to meet their quarantine regulatory requirements. By using the disinfestation/disinfection of VHT treatment, provides 100% mortality of all the stages of Oriental and Melon fruits flies and preventing the storage rot at post harvest stage which are the major constraints for the export of fresh Indian mangoes to other developed countries specially Japan and USA. This equipment is an urgent requirement for developing the large scale quarantine standards for opening the export windows for Indian mangoes in the international market.

The semi-commercial VHT equipment has already been procured and it is expected to be operational. This first ever commercial VHT equipment is being installed at APMC Market Yard, Vashi, Navi Mumbai, keeping in view the major Mandi for procuring fruits & vegetables.



Implementation of HACCP in Mango pulp processing units at Krishnagiri District of Tamil Nadu

In order to improve the quality of processed mango pulp which is the main processed production of mango being exported APEDA has assisted 12 mango pulp processing units of Krishnagiri District of Tamil Nadu in implementation of HACCP as a group scheme. The project was taken up by APEDA in March 1999. Just before the mango pulp processing season and has taken about 4 months for completion. Out of the 12 units, the following six units have been assessed and certified for HACCP by Quality Assurance Services (QAS), Australia.

- Thenamootu Foods Pvt. Ltd.
- Sree Mahalakhmi Fruit Products Pvt. Ltd.
- Kavin Foods Pvt. Ltd.
- Amritham Agro Industries Pvt. Ltd.
- R R Fruit Products Pvt. Ltd.
- Paiyur Fruit Products Pvt. Ltd.

A step by step approach was followed for the implementation:

Step I - Conduct of an Awareness Programme on Quality and Safety Management systems for owners.

Step II - Identification of Infrastructural Modification required and implementation of these.

Step III - Identification of Hazard and Preparation of HACCP Plan.

Step IV - Development of entire document including standard Operating Procedure, Development of prerequisite Programme, work instruction, record format etc.

Step V - Training Programme for Supervisors, Chemist and Casual Labour on relevant portion.

Step VI - Implementation of System till Stabilization.

Step VII - Certification.



Awarenes Programme

Awareness Programme on production of export quality mangoes was organised at Tuni (Visakhapatnam District) on 23rd October, 1999. Scientists from IIHR, Technical Coordinator (Mango) gave inputs to farmers of the requested A Suvarnarkha fruit grown in this area for exports.



Study on India's Export Potential of Honey

APEDA has conducted Study on India's Export Potential of Honey with respect to major importing countries and a survey of domestic scenario. This survey has been researched and written by M/s. Sarparveen Kaur. They have submitted a detailed report and a copy of the same is available in the APEDA library. The report gives strategy required for establishing India as an exporter of Quality Honey. It also views the current situation and the potential for expansion in the domestic as well as export markets.

To achieve the above, major importers, packers, retailers and quality testing laboratory personnel in the importing countries were interviewed and the distribution channels and market preferences

studied; also the quality control methods employed and the access to the honey from India. A study of the major honey producing countries and the reasons for their success has also been studied. Data was compiled from the relevant trade information, journals, and statistics and from the internet.

For the domestic study in each of the 12 indentified States, the relevant organisations, bee keepers and trade were contacted personally and the status of beekeeping and the honey industry in the State, its beeflora, problems and potential has been studied. A brief study of the retail honey market was also conducted.

On the basis of the above information a strategy for development of the Indian beekeeping and honey industry has been prepared.

A SWOT analysis of the Honey and Beekeeping Industry in India succinctly mentions that India has a vast potential for increasing Honey production in many States with *Apis mellifera* from existing agricultural and horticultural crops and forests. India has diverse varieties of available beeflora. There is also potential for industrial use of honey as is done in the USA for bakery, pharmaceutical, brewery, cosmetics and food industry.



Training Programme on Quality Management Systems for Laboratories as per ISO/IEC Guide 25.

A three - day Training

Programme on Quality Assurance Systems for Laboratories was organised by APEDA in collaboration with Department of Science and Technology from 23-25 November 1999 at Institute for Design of Electrical Measuring Instruments, (IDEM), Mumbai. 13 Laboratories from various parts of India like Gujrat, Maharashtra, Tamil Nadu, Kerala and Delhi from private and Government sector participated in the Programme. The Programme covered the topics like:

- General criteria applicable to all kinds of laboratories as per the ISO/IEC Guide 25.

- Preparation of Quality Manual as per the International Criteria.

Internal audit, Review and Quality Control.

The faculty for the Programme include Dr. D. S. Tewari, Scientist, and Mr. R.K. Tayal, from National Accreditation Board of Laboratories, DST.



Implementatin of Infrastructure Scheme

APEDA implements various financial assistance schemes, extending financial support to the potential exporters for undertaking the various activities related to horticulture exports. The schemes in implementation are approved by teh Government o India on finacial yer basis after review of past performance. Our scheme for infrastructure development, where a number of activity componerare listed for providing the financial assistance the eagh Apeda, may not be extended byond 31st March 2000. We would like t suggest to our member exports who are interested in setting up necessar infrastruce under this scheme with the financial support of Apeda the the applicatin fo seekig financial assistance may be submitted at th earliest so that our assistance as per

the procedure can be availed of by the deadline.



APEDA Export Awards-1999

The Export Awards Function was organised by APEDA on March 27, 2000 at New Delhi. After the welcome speech by Sh. D. Rajagopalan, Chairman, APEDA, presentations on "Virtual Trade Fair" prepared by a consultant and CD ROOM on "Food India" prepared by M/s Chorda Technology for APEDA were presented. The CD Room was released by Shri P.P. Prabhu, Union Commerce Secretary. The Exports Awards were later presented by Shri Omar Farooq Abdullah, Union Minister of State for Commerce & Industry to various Companies and Firms who have excelled in export of Agri-foods in 1998-99.

Some of the Awardees in the Processed Food Sector are listed below:-

Sl.No.	Name of Awardee	Products exported
SILVER TROPHY		
11.	Allanasons Ltd. Mumbai	Frozen foods.
12.	Hindustan Gum & Chemicals Ltd. Bhiwani.	Guar gum.
13.	Cephram Milk Specialities Ltd., New Delhi	Dairy Products.
14.	Mehta Brothers, New Delhi	Walnuts, Walnuts Kernels, Mushrooms (morels & Bitter Apricot Kernels etc.
15.	Bhagwandas Bherumal & Co., Mumbai.	Fresh fruits, vegetables and onions.
16.	National Dairy Development Board. Anand.	Quality Agro Products.

BRONZE TROPHY

17.	American Dry Fruits Ltd., Mumbai	Indian Processed Foods.
18.	Al. K. L. Food Ltd. Mumbai	Frozen Meat Products.

9. Mahaan Proteins Ltd., New Delhi
10. Indian Tropical Agro Products (P) Ltd. Tuticorin
11. Dewan Chand Dholan Das & Co., Delhi
12. Kay Bee Exports, Mumbai.

BRONZE TROPHY

13. M.K. Group, Delhi
14. Hind Agro Industries Ltd. New Delhi
15. Jai Bharat Gum & Chemicals, Hisar, Haryana
16. Fair Exports (I) P. Ltd. Mumbai
17. Gujarat Co-operative Milk Marketing Federation Ltd. Anand, Gujarat.
18. Vadilal Industries Ltd., Ahmedabad.
19. Sudarshan Overseas Ltd., New Delhi
20. Flex Foods Ltd., NOIDA
21. Venkateshwara Hatcheries Ltd., Pune.
22. Almas Impex, Mumbai.
23. Mahagrapes, Pune
24. Chordia Food Products Ltd. Pune
25. Pepsico India Holdings Ltd., Gurgaon.

CD on "FOOD INDIA"

M/s Chordia Technologies (India) Pvt. Ltd., Pune have produced a CD on "FOOD INDIA" on behalf of APEDA and the same was released by Shri P.P. Prabhu, Union Commerce Secretary on 27.3.2000 at the APEDA Export Award function.

The CD covers Agricultural Produce pattern in India, details of crops, Food Processing manufacturers, raw material suppliers, latest information in Food Processing technology, food laws, Government policy, details of consultants, financial schemes, etc. This compilation is the first of its kind for the food industry.

The cost of each CD is Rs. 3000/- (Rs. Three Thousand only) and it can be obtained by sending a draft for the amount in favour of "Chordia Technologies Pvt. Ltd." to M/s Chordia Technologies (India) Pvt. Ltd., 48/A, Parvati Industrial Estate, Pune-Satara Road, Pune-411 009 Tel 020-4226543, 4227833 Fax - 020-6814282 E-mail: techc@vsnl.com

Dairy Products.

Growing of Gherkins, Processed and Preserved Gherkins.

Walnuts, Walnut Kernels, Dried Black Mushrooms (morels) & bitter apricot Kernels.

Fresh Fruits, Fresh Mangoes, Fresh / Frozen Vegetables, Processed Foods etc.

Meat Products.

Export Oriented Integrated Modern Abattoir-cum-Meat Processing Plant.

Quality Guar gum Products.

Frozen / Fresh Meat of Buffalo / Veal / Goat / Sheep.

Dairy Products.

Ice-Creams, Canned and Frozen Fruit Pulps, IQF Fruits and Vegetables, Canned Fruits and Vegetables, ready-to-eat foods and condiments in brine.

Fruit Pulp & concentrate.

Freeze dried Mushrooms.

Poultry Products.

Fresh Fruits & Vegetables.

Grapes.

Pickles and Chutneys, Curry Pastes, Tomato Ketchup, Instant Mixes and Snackfood items.

Guar gum, Agri products.

GOVT. CIRCULAR

Minutes of the 28th Meeting of the Food Additives Sub-Committee of CCFS held on 13.1.2000

The 28th meeting of Food Additives Sub-committee of C.C.F.S. was held on 13.1.2000 under the chairmanship of Dr. V. Prakash, Director, Central Food Technological Research Institute, Mysore.

Chairman extended a cordial welcome and Happy New Year & Millennium to the participants. In his opening remarks and before taking up agenda items the Chairman stressed the need of more interest in the work of the Sub-committee by the members. He proposed that for better and coordinating working of Sub-committee following guidelines needs to be followed:

- i) That it is essential that only member nominated as per the composition of the sub-committee attends the meeting regularly and the adhoc approach to the matter of sub-committee by deputing one person in one meeting and another in the next meeting, be discontinued. Only nominated member as per the composition of the sub-committee will be allowed in future and in no circumstances more than one person from one organisation will be allowed to attend the meeting. However, he observed that in case of official nominee, officer whosoever nominated by the concerned office/Deptt. may attend the meeting because of nature of work in Govt. and other policy matters.
- (ii) The practice of circulating documents after fixing the date of meeting and on the day of the meeting needs to be stopped since the members of the Committee cannot find time to go through such documents in such a short notice. He, therefore, proposed that any item to be included in the agenda must get the approval of Chairman for inclusion in the agenda and such items must be finalised two months before the date of meeting. No item be included in any agenda without approval of Chairman. If need be the agenda items may be examined by a group of 4-5 members and finally got approved from the Chairman before inclusion as agenda for the meeting.
- (iii) All the agenda items will be circulated only by the Secretary, C.C.F.S. and no member will circulate any agenda item/paper to the members of the sub-committee.
- (iv) The recommendations of the sub-committee should not be leaked till the minutes are issued by the Secretariat. Such members who leaked out the decisions of the meeting or quote such decisions in any communication may not remain member on any sub-committees of CCFS.
- (v) For clearing any food additives for use in Food, following criteria may be examined:
 - i) What is technological need for use of the additives.
 - ii) Why the additive is essential for use in food.
 - iii) What is the technical justification for its use.
 - iv) In which food products the additive is proposed to be used.
 - v) In what concentration the additives are proposed to be used.
 - vi) What is the method of analysis and quantification method.

Thereafter agenda items were taken up for discussions:-

Item No. 0 - Confirmation of the minutes of the last (27th) meeting.

The Sub-committee noted the comments of Dr. S.K. Khanna, I.T.R.C., Lucknow and decided that name of the individual member will not be mentioned in the minutes. Thereafter the sub-committee confirmed the minutes of last meeting.

Item No. 1 - Action taken report on the minutes of the last meeting.

The sub-committee noted action taken on the recommendations of the last meeting. The following point emerged:-

1) Use of BHA in chewing gum & bubble gum, 2) Defning Processing Aid in PFA, 4) Use of samperfresh as proteching agent in fruits & Vegetables.

The sub-committee recommended to send a final reminder to those organisations from where information is awaited and if the required data from the industry is not received within 15 days, the agenda item be dropped. This decision should be incorporated with the Codex list approval also.

5) Use of menthol in pan masala, chewing gum and confectionary

The representative of ITRC, Lucknow submitted the required paper in the meeting which will be considered in the next meeting.

7) Review of limit of MSG in food

The additive is required as per the recommendations of the scientific symposium, which is now published in the form of a book held at Krishnarajasagar, Karnataka. Hence, the recommendation can go to CCFS.

Item No. 2 - Use of food additives permitted by Codex Alimentarius Commission for use in food in general, unless otherwise specified in accordance with GMP.

Chairman informed the sub-committee that :-

- i) Ministry of Health and F.W. organised a workshop at CFTRI, Mysore on 18-19, Nov. '99 to deliberate on the use of food additives which have been approved by Codex as GMP. There are 170 food additives out of which about 50 additives are already allowed under PFA Rules in general or specific use in the food.
- ii) In the workshop all the additives were reviewed and some more additives were screened for discussion in the Sub-committee for inclusion under PFA Rules.
- iii) A status paper prepared on the basis of recommendations of workshop was circulated alongwith agenda papers for consideration by the Sub-committee.
- iv) These additives are classified in the following categories -

A) Stabilizing, emulsifying and thickening agents -	40 additives
B) Artificial sweetners & polyols-	7 "
C) Food colours -	14 "
D) Enzymes -	11 "
E) Food additives Miscellaneous	
a) Acidity regulators -	24 "

b) Firming agents -	7	"
c) Gelling agents	3	"
d) Leavening agents -	3	"
e) Anticaking agents -	5	"
f) Humectants -	4	"
g) Antifoaming agents -	1	"

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(v) The Chairman further informed the Sub-committee that in the workshop 5 groups were given the task to review the above additives and submit the recommendation to the chairman for consideration by the sub-committee. The status paper circulated is as per the recommendation of 5 groups.

Thereafter the additives were considered by the sub-committee.

The Chairman presented each additives with the help of transparencies on OHP with detailed technical information prepared/compiled by the scientists of CFTRI, Mysore. Each additive/chemical was screened in detail in the light of technical details of each additives. Following were the recommendations of the sub-committee:

A. Stabilishing, emulsifying and thickening agents:-

1. Agar		Cleared for use
2. Algenic acid		-do-
3. Alkaline treated starch	Modified	NIN, Hyderabad will send details
Starch acetate	Starches	
4. Sodium alginate		Cleared for use.
5. Calcium alginate		"
6. Carrageenan		NIN will send details.
7. Guar gum		Cleared for use
8. Gum karaya		"
9. Gum arabic		"
10. Carobbean		"
11. Gum tragacanth		Not cleared. VOICE will give details.
12. Bleached starch		Cleared.
13. Dextrins		Cleared.
14. Sorbitol		Cleared.
15. Pectins/Pectates		Cleared.
16. Calcium lactate		Cleared.
17. Lecithin		Mr. Sardana, (CIFTI) will provide information
18. Gellan gum		Cleared.
19. Mono and Diglycerides of fatty acids		"
20. Salts of Myristic, palmitic and stearic acids (Ammonium,		

Calcium, Potassium & Sodium)

21. Salts of Oleic acid (Calcium, Potassium and Sodium)	"
22. Methyl ethyl cellulose	"
23. Methyl cellulose	"
24. Ethyl cellulose	Not cleared. Chairman will provide information
25. Sodium carboxy methyl cellulose	Cleared.
26. Hydroxy propyl cellulose	Not cleared.
27. Hydroxy propyl methyl cellulose	"
28. Powdered cellulose	"
29. Microcrystalline cellulose	Not cleared. NIN will send literature on this
and size of	cellulose.
30. Poly dextroses	Not cleared. Mr. Sardana (CIFTI) will provide required information.
31. Lactic acid/fatty acid esters of glycerol.	Cleared.
32. Tartaric acid, acetic acid, fatty acid esters of glycerol.	"
33. Tara gum	Not cleared. Mr. Sardana, CIFTI will provide information.
34. Talc	Cleared.
35. Magnesium glutamate DL-L	Not cleared.
36. Mono sodium glutamate	Cleared.
37. Mono-potassium glutamate	Not cleared.
38. Mono-ammonium glutamate	Not cleared.
39. Nitrous oxide	Not cleared.
40. Nitrogen	Cleared for packaging purpose.
B. Artificial sweeteners/Polyols	
1. Isomalt	Cleared.
2. Lactitol	"
3. Mannitol	"
4. Maltitol (including Maltitol Syrup)	"
5. Sorbitol (including Sorbitol Syrup)	"
6. Thaumatin	"
7. Xylitol	Not cleared. Cleared.

The Sub-committee recommended that -

- In all the above cases upper limit of additives for use in food is essential to be fixed.
- NIN will send reprint on the above to chairman.
- Dose related problem has to be resolved based on literature/ADI.

C. Food colours

- Beet Red
- Titanium Dioxide

Cleared.
NIN has reservations. NIN will provide

	information to Chariman since T10 ₂ was reviewed in 1982.
13. Caramels-Class I	Cleared
14. Caramels-Class II	Cleared.
15. Caramels-Class III	Cleared.
16. Caramels-Class IV	Cleared.
17. Aluminum lakes of permitted colours	Not cleared since these are not in the list of Codex.
18. Copper Chloropyll complex	"
19. Allura Red AC	"
110. Brown HT.	"
111. Iron oxide	"
112. Erythrosine	Cleared
113. Curcumin	"
114. Marigold Yellow	Not cleared since it is not in the Codex list.
115. Chlorophyl	Cleared
D. Enzymes	
1. Alpha Amylase (<i>A.oryzae</i> var.)	Alpha amylase is already allowed in specific foods
2. Alpha Amylase (<i>Bacillus megaterium</i> expressed in <i>bacillus subtilis</i>)	These are not food additives but are processing aids So not cleared for use as additives.
3. Alpha Amylase (<i>Bacillus stearothermophilus</i> expressed in <i>B.subtilis</i>)	"
4. Alpha Amylase (<i>Bacillus stearothermophilus</i>)	"
5. Alpha Amylase (<i>Bacillus subtilis</i>)	"
6. Alpha Amylase (Carbohydase) (<i>Bacillus licheniformis</i>)	"
7. Bromelain	"
8. Glucose oxidase	"
9. Lipase (Animal sources)	"
10. Lipase (<i>Aspergillus oryzae</i> , var)	"
11. Papain	"
E. Food Additives (Miscellaneous)	
(a) Acidity Regulators	
1. Calcium acetate, Sodium acetate & Potassium acetate	Not cleared
2. Calcium sulphate	"
3. Potassium hydrogen malate	"
4. Lactates of Calcium, potassium and Sodium	Only Calcium Lactate is permitted as emulsifying agent.

5. Ammonium lactate
6. Sodium dihydrogen citrate
7. Potassium dihydrogen citrate and tripotassium citrate
8. Calcium citrate
9. Sodium & potassium malate

All these will be considered on case to case basis and food to food basis. These are not cleared in general.

10. Sodium dihydrogen malate
11. Sodium fumarate
12. Ammonium citrate
13. Sodium Carbonate
14. Sodium Sesquicarbonate
15. Sodium bicarbonate & Potassium bicarbonate
16. Potassium carbonate
17. Ammonium bicarbonate
18. Magnesium carbonate
19. Magnesium bicarbonate
20. Hydrochloric acid
21. Potassium sulphate
22. Sodium, calcium, ammonium and magnesium hydroxides
23. Calcium oxide
24. Magnesium gluconate

Already cleared in specific food.

Not cleared.

Cleared.

"

Not cleared

"

"

Not cleared

Already cleared in specific food.

Not cleared

b) **Firming Agent**

1. Calcium chloride
2. Calcium sulphate
3. Calcium citrate
4. Calcium lactate
5. Calcium gluconate
6. Potassium chloride
7. Calcium carbonate

Cleared in some specific products.

To consider for case to case basis.

"

For specific purpose

In some specific food.

Cleared.

"

c) **Gelling agents**

1. Pectin
2. Salt of pectin, Calcium, Potassium, sodium & ammonium alginates
3. Potassium chloride

Cleared in specific product

"

Not cleared.

d) **Leavening agents**

1. Calcium lactate
2. Ammonium chloride
3. Calcium oxide

Cleared for specific food

Cleared

Cleared.

e) Anticaking agents

- | | |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 1. Silicon dioxide | Cleared for specific food products, NIN has sent literature against its use in all foods. |
| 2. Calcium silicate and aluminium silicate | " |
| 3. Aluminium sodium silicate (Sodium silico aluminate) | Not cleared |
| 4. Magnesium oxide | To examine |
| 5. Calcium carbonate | Cleared in specific food |

f) Humectants

- | | |
|-------------------|-------------------------------|
| 1. Glycerol | Cleared |
| 2. Sodium lactate | Cleared |
| 3. Sorbitol | Cleared in specific products. |
| 4. Poly dextrose | Not cleared. |

g) Anti foaming agents

- | | |
|------------------------------------------|--------------------------|
| 1. Mono and di-glycerides of fatty acids | Permitted under Rule 60. |
|------------------------------------------|--------------------------|

Summing up the presentation, Chairman requested all the emembers to send the details of any additives in the list, available with them for consideration. He also requested members to send their curriculam vitae for consideration for forming the group for examining the agenda items for considerations.

Chairman further injformed the sub-committee that the additives which will be cleared by the sub-committee will have smooth sailing while considering in specific food. These will be considered as safe additives but will be considered on case to case basis. He therefore asked the members and specifically the industry to submit their request for use of the additives cleared by the sub-committee. The request should contain the following details :

1. Name of the additive
2. Food products where it proposed to be used
3. Max. amount to be used
4. Specification of additives.
5. Methods of analysis.
6. Process i.e.need of the chemical in the products.

The information be supported with technical literature.

Regarding giving time to any industry for presenting their cases before the sub-committee, it was decided that such industry may send the material in advance what they propose to present and in case any clarification will be required, they will be called. This will save the time and help the sub-committee to deal all cases with speed.

The agenda items which could not be discussed due to shortage of time will be discussed in the adjourned meeting to be held in Feb.'2000.

The meeting was adjourned with thanks to the Chair.

F.No.609/53/2000-DBK
Government of India
Ministry of Finance
Department of Revenue

New Delhi, the 8th May , 2000.

To

All Chief Commissioner of Customs & Central Excise,
All Commissioner of Customs,
All Commissioner of Customs and Central Excise

Sir,

"Drawback Arrear clearance Month" had been observed last year at various Customs locations to clear old pending draw back claims as directed in Board's Circular Nos. 25/99-Cus. dated 21. 5. 99 and 43/99-Cus. dated 9.7.99 .

2. Representations have been received from various exporter's organisations requesting that "Drawback Arrear Clearance Month" should be observed at all Customs location this year also .

3. The matter was brought to the notice of Chairman ,CBES who has directed that the period from 15th May, 2000 to 14th June, 2000, shall be observed as " Drawback Arrear Clearance Month" at all Customs Locations throughout India .

4. Accordingly, it is directed that all drawback claims and related issue which have been pending with the Department must be finalised expeditiously, well before the statutory dead - line for payment of interest is attracted.

5. All cases where processing / disbursement of drawback is pending for want of re-construction of old files must also be up and disposed of within the said month . A specific report should be sent to the board latest by 23rd June, 2000. Indicating the number of such claims disposed of during the said period , amount of drawback disbursed and the claims pending at the end of the "Drawback Arrear Clearance Month" .

6. The receipt of this Circular may please be acknowledge .

Yours faithfully,

sd/-

(Sandeep Ahuja)

UNDER SECRETARY TO THE GOVERNMENT OF INDIA

Copy to :

- (1) Delhi exporters Association,
- (2) Federation of Indian Export Organisation,
- (3) All Export Promotion councils.



EXPORT POSSIBILITIES

1. Intervan, S.A.
C/Forja, 8
28850-Torrefion De Ardoz
Madrid
Tel: 34-91-6751691
Fax: 34-91-6565589
E-mail : intervan@mad.servicom.es
Product: Hard-boiled sweets with natural ingredients: coffee, tea, honey. Fruit sweets with mild, mint, cocoa, liquorice, eucalypts, aniseed. Soft toffees and fruit sweets. Chewing gum.
Contact : Mr. Da. Emmanuelle Dane
2. Pastor Y Canals, S.A.
Ca. Pinto-S. Martin de la vega, Km. 0,700
Apartado de Correos 24
28320- Pinto/Madrid
Tel: 34-91-6911263
Fax: 34-91-6914958
E-mail: roypas@servipinto.com
Product: Confectionery and sweets. All Types of sweets: with vitamins, diet, boiled, etc.
Contact: Mr. D. Jose Maria Ots
3. Ambika, S.L.
C/Dr. Esquerdo, 114
Local
28007 - MADRID
Tel: 34-91-4333054
Fax: 43-91-5511973
Product: Food in general : 100% fruit juices, biscuits, mineral water, all types of wines, sangria, soft drinks, olive, cereals, desserts, yoghurts, butter, honey, tinned and bottled foods.
Contact: Mr. Sr. Somesh
4. Trpopifrut Ltd.
Pirivena Road,
Molligoda, Wadduwa
Sri Lanka,
Tel: 034-35791, 074-84370
Fax: 034-35791, 074-282370
Product: Fruit drinks / juices, milk-whole, low fat milk, coconut cream, ice tea (tetra pack-200ml/100ml)
Contact: Mr. James Perera

* **Source:** Overseas Business Contacts, Assocham, Jan 1, 2000 & Dec 15, 1999



HELP LINE

HAZARD ANALYSIS AND CRITICAL CONTROL POINTS (HACCP)

Why have HACCP Programme ?

In the Indian Food Industry, HACCP is not compulsory but food poisoning is on the increase in the country. Nowadays, with more people depending on ready to cook and instant mix food products, the legal implications associated, when something goes wrong, may be quite serious. Hence it makes more sense for food processing organisations to equip themselves proactively by making sure their products are as safe as possible. HACCP is one such internationally accepted system implemented for ensuring Safe Food.

What is HACCP?

1. With the advent of ISO 9000 series of standards, the concept of quality has taken a tangible form. These standards have made a dramatic impact on business around the world. For the first time there is a broad consensus about quality system's minimum requirements. This is the reason why ISO 9000 has unanimously received world wide acceptance. This presents a good opportunity for the food industry for upgrading quality and bringing uniformity and consistency in their supplies to international market.

2. In today's global market, quality and food safety have become competitive edge for the enterprises producing foods and providing services. The food industry plays an important role in the national economy. It has a major share in India exports. Since the international market has become demanding in terms of quality, safety and delivery, installation of ISO9000 Quality Management Systems and Hazard

Analysis Critical Control Points (HACCP) based food safety management programme in food industry would provide a competitive advantage to food supplies in the international market.

3. The HACCP and Quality System Standards seek to accomplish the following three objectives with regard to quality and safety.

(a) The industry should receive and sustain the quality and safety of the product produced so as to meet customer's stated or implied needs.

(b) The industry should provide confidence to its own management that the intended quality and safety is being achieved and maintained.

(c) The industry should provide confidence to the customer that the intended quality and safety is being or will be achieved in the delivered product.

4. The HACCP system is a well established concept in food safety which identifies specific hazards and provides preventive measures for their control to ensure the safety of food. The application of HACCP is compatible with the implementation of ISO 9000 and provides an excellent framework for the inclusion of the HACCP principles. The pace of application and necessity for adherence to HACCP has accelerated considerably due to the following reasons :

a) Microbiological food borne hazards have come to light, caused by hitherto unrecognized microbes.

b) Global sourcing of raw materials is rapidly increasing.

c) Increasing quantum of finished products in the world market coming from different sources and widely geographically distributed area and

d) Increasing trend of food borne hazards and concern for human health has made it imperative for governments to adopt a global approach for providing assurance on food safety.

5. HACCP is a tool to assess hazards and establish control system that focus on preventive measures rather than relying mainly on end product testing. It is now widely adopted by the food industries and by the government regulatory agencies around the world as a most cost-effective means of minimizing the occurrence of identifiable food borne biological, chemical and physical hazards and maximizing product safety. It is a system which targets critical areas of processing, and in doing so reduces the risk of manufacturing and selling unsafe products.

6. HACCP can be applied throughout the food chain from the primary producer to final consumer. It enhances food safety, better use of resources and more timely response to food safety problems. The application of HACCP systems can also aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety. The successful application of HACCP requires the full commitment and involvement of management and the work force as in case of ISO 9000.

7. It is a system which can be used to assure food safety at all levels of food handling and is an important

element in the overall management of food quality and safety more commonly referred to as Good Manufacturing Practices.

3. The most effective way to implement HACCP is through ISO 9000 route which provides a better documented framework for managing the activities of an organization. The HACCP approach adds value to ISO 9000 Quality Management System and a combined effect would be a safe and wholesome food to consumers.

The role of WHO in HACCP development

The objective of WHO is the attainment by all peoples of the highest possible level of health. Health, as defined in the WHO Constitution, is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. In support of its

main objective, the Organization has a wide range of functions, including the following:

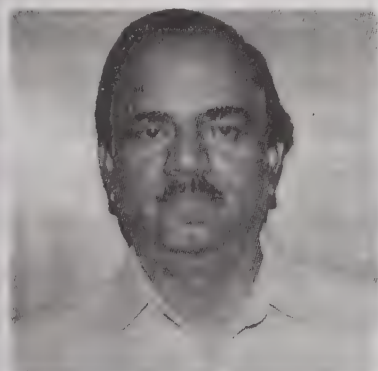
- To act as the directing and coordinating authority on international health work
- To promote technical co-operation
- To assist Governments, upon request, in strengthening health services.

Since its inception, the World Health Organization (WHO) has been working towards the improvement of food safety. Its work involves both technical cooperation with Member States to strengthen national food safety programmes and normative functions, i.e. developing the scientific basis for managing food safety programmes and food safety-related issues.

One of the key roles of the

WHO Food Safety Programme is to promote food safety and to provide the necessary guidance on how to achieve this. WHO has promoted the application of the Hazard Analysis and Critical Control Point (HACCP) system in food production and processing enterprises. WHO has, through a series of consultations and workshops, enhanced the basic understanding of HACCP by harmonising the terminology and the approach to its application. WHO has regarded the HACCP approach as an important tool to strengthening food safety in all food businesses, including restaurants, cottage industries and street food vendors. WHO has produced a number of manuals and guidance documents to assist in the development of HACCP programmes for particular food sectors, and in collaboration with other agencies, has implemented HACCP training courses in many countries.

Mr. J.S. Srivastava, past President of ALL INDIA FOOD PROCESSORS' ASSOCIATION (AIFPA) has been conferred the Dadabhai Naoroji New Millennium Award New Delhi-2000 in his capacity as Managing Director of Modern Food Industries (I) Ltd., The Award is reproduced below:-



Mr. J.S. Srivastava
Managing Director
Modern Food Industries (I) Ltd.

If one has tasted a loaf of bread or sipped juice, he would smell Modern Food Industries (India) Ltd. headed by Mr. Srivastava, as Managing Director. He is specialised in Food & Fruits Technology and has nurtured the industry from infancy. He is the recipient of Kashalkar Memorial Award. He is pioneer in Energy Food and is closely associated with Cooperative of Associations for Relief Everywhere (CARE); WMP; and All india Food Preservers' Association. He has travelled extensively both in the country and abroad for the advancement and adoption of sophisticated modern technologies.

RESEARCH ARTICLES

STUDIES ON THE PREPARATION AND STORAGE EVALUATION OF QUICK COOKING SPROUTED GREEN GRAM (*VIGNA RADIATA* L) CURRY MIX

D.K.Das Gupta and C. Nanjappa

Defence Food Research Laboratory, Mysore - 570 011.

New Delhi-110 012

ABSTRACT

A quick cooking dehydrated ready mix was developed based on sprouted green gram and gravy mix consisting of spices along with tomato powder as used traditionally. The mix had 16.4% protein, 5.9% fat and a calorific value of 365 KCal/100 g. It should be reconstituted in boiling water in 10 min and 340 g cooked curry can be obtained from 100 g dehydrated ready mix. Storage studies showed that when packed first in polypropylene and then in an outerwrap of paper-aluminium foil-polyethylene laminate, the product remained acceptable for 6 months at 37°C.

INTRODUCTION

Legume is an important constituent of Indian diet. It is a rich source of protein and India is the largest producer of grain legumes. The problems associated with its utilization are prolonged cooking time and antinutritional factor. Among the legumes, green gram (*moong*) is largely consumed because of its less cooking time and lower antinutritional constituent compared to other legumes. Green gram can be an excellent source of protein with higher digestibility¹. It is generally utilized in the form of whole, split (*dal*), sprouted, boiled, roasted and fried form in Indian culinary preparations. Sprouting of legumes generally improves digestibility, reduces

antinutritional factor and improves the nutrient content². Sprouted legumes cannot be kept for long at ambient conditions because of its high moisture content. Although there are some reports³ on the dehydration of sprouted *moong*, no systematic study was made on preparation of quick cooking curried dish from sprouted *moong* and its storage stability. Market potential for quick cooking convenience food is increasing due to rise in the affluence of Indian middle class.

The present communication describes the results of preparation, physico-chemical evaluation and storage studies undertaken for the development of a quick cooking curry mix based on sprouted *moong*.

MATERIALS AND METHODS

Green gram (*moong*) was purchased from the local market, washed thoroughly in tap water and soaked in three times water (boiled and cooled) for 6 hours. It was then drained, wrapped in a muslin cloth tightly and kept in a covered vessel at room temperature (25-35°C) for germination. It was found that 20 hours were required to develop approximately 1cm sprout. It was then cooked in an autoclave at 5 psi for 3 min and dried in a cabinet drier (Kilburn) at 60°C for 6 hours.

Formulation of Spice Mix : Spice mix was formulated by mixing coriander powder, chilly powder, cumin powder, turmeric powder, *garam masala*, tomato powder, corn

starch, salt, *dalda* and fried onion, Coriander and cumin were roasted before grinding to powder. Turmeric powder and chilly powder were steamed for 2 min and then dried in oven at 90°C for 1 hr. Corn starch was roasted before mixing. Tomato powder was prepared by extracting tomato pulp by hot break process, double concentrated and mixed with corn starch prior to drying in a cabinet drier. Onions were prepared by frying cut onion in *dalda* for 12 mins till the onions became brown.

Preparation of curry : For curry preparation, 70g of dehydrated sprouted green gram were cooked in 5 times (350 ml) boiling water for 8 mins 30 g spice mix was then added and allowed to simmer for another 2 min. Thus 340 g cooked curry was obtained.

Sorption Isotherm: Samples of dehydrated sprouted green gram, previously powdered, were exposed in petridishes on different relative humidities (11% to 84%) at ambient temperatures inside desiccators containing saturated solutions of appropriate salts⁴. Samples were weighed periodically until constant weight was obtained or mould growth took place. The equilibrium moisture content and initial moisture content were determined by vacuum oven. Sorption isotherm was obtained by plotting equilibrium moisture content against ERH. Monomolecular moisture content was calculated using BET equation and from the slope and intercept of the BET plot.

Storage Studies : Samples of

precooked dehydrated sprouted green gram (70 g) and spice mix (30 g) were packed separately in polypropylene pouches (300 gauge) and then both were inserted into pouches of paper (60 gsm)-Aluminium foil (0.02 mm)-polyethylene (75 μ) (PFL). The pouches were then stored at different temperatures of refrigerated (0-4°C), room temperature (RT, 20-35°C) and 37°C. The samples from each condition of storage were removed periodically and evaluated chemically and organoleptically.

Sensory Evaluation : The curry was prepared for sensory evaluation as described earlier and evaluated by 12 panelists drawn from the scientific staff of the laboratory. They have scored the sensory characteristics of colour, aroma, taste, texture as well as overall acceptability according to Hedonic scale where 9=like extremely and 1=dislike extremely.

Analytical Methods : All proximate principles viz. protein, fat, mineral content, crude fiber and moisture were carried out by AOAC methods⁵. Thiobarbituric acid (TBA) value was done by the method of Tarlagdis et al⁶.

RESULTS AND DISCUSSION

The formulation as per ingredients composition given in Table 1 was found to yield on reconstitution a product similar to freshly made curry based on fresh sprouted *moong*. During the experiments it was found that it was desirable to pack the gravy and sprouted green gram separately as

this enabled dehydrated material to be rehydrated prior to the addition of gravy to minimise over cooking and retain the full flavour on rehydration. Further it was found difficult to achieve uniform mixing and ensure correct proportion during packing due to tendency of the spice mix to settle down in the mixing vessel. Incorporation of tomato-starch powder gave the best final product in terms of consistency and flavour.

The proximate composition of dehydrated sprouted green gram spice mix and the complete curry mix are given in Table 2, which show the composition to be nutritious with 16.4% protein, 5.9% fat and 365 K Cal/100 g.

Organoleptic score for texture, colour, aroma, taste as well as overall acceptability for the mix packed in polypropylene pouch with foil laminate outerwraps and stored at three different temperatures are given in Table 3. The data showed that the product remained acceptable upto 6 months at 37°C. Among the individual sensory attributes there was least change in colour followed by aroma, taste and texture.

TBA values which are a measure of oxidative rancidity of the product are shown in Table 4 separately for dehydrated sprouted green gram and spice mix during storage at different temperatures. It showed that change was more in case of spice mix than dehydrated green gram. Maximum oxidative degradation occurred in spice mix at 37°C whereas in case of dehydrated sprouted green gram it

was comparatively much less. The reason for getting low value in organoleptic evaluation during 6 months storage at 37°C was high TBA value of spice mix at that temperature.

Moisture sorption isotherm at 25°C for raw and dehydrated sprouted green gram is shown in Fig.1 and it showed type II isotherm (sigmoidal) for both according to BET classification. Foods rich in carbohydrates (starch) have been reported to show this type of isotherm. Monolayer moisture content calculated from BET equation was found to be 6.8 and 4.3 g/100 g for raw and precooked dehydrated sprouted

green gram respectively. Since it is well known that oxidative degradation is accelerated below the monolayer value, it was necessary to keep the moisture content of the product (6.5%) above that to ensure maximum stability.

ACKNOWLEDGMENT

The authors are thankful to Dr. S.S. Arya, Director, Defence Food Research Laboratory, Mysore for his encouragement and kind premission to publish this paper.

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Table 1. Composition of Precooked Dehydrated Sprouted Green Gram Mix

Component	Quantity (g/100 g)
Sprouted green gram, dehydrated	70.0
Onion, fried	7.50
Tomato-starch powder	7.50
Coriander powder	5.40
Cumin powder	0.90
Chilly powder	1.20
Ginger powder	0.39
Turmeric powder	0.39
Corn starch	0.75
Salt powder	4.50
Garam masala powder	0.27
Dalda	1.20

Table 2. Proximate Composition of Precooked Dehydrated Green Gram Mix

Principle	Dehydrated & Sprouted Green Gram	Gravy Mix	Sprouted Green Gram Mix*
Moisture (%)	6.5	5.27	6.13
Protein (N x 6.25) %	20.5	6.80	16.39
Fat (Ether ext.) %	1.6	15.90	5.89
Carbohydrate (by diff. %)	64.9	54.28	61.71
Total Ash (%)	2.8	9.55	4.83
Crude fibre (5)	3.7	8.20	5.05
Calories (KCal/100g)	356	387	365

*(Sprouted green gram : Gravy = 70 : 30)

Table 3. Organoleptic Score* during Storage of Precooked Dehydrated Sprouted Green Gram Mix at different Temperatures.

Period (month)	Storage Temp. (°C)	Colour	Aroma	Taste	Texture	Overall Acceptability
Initial	-	7.4±0.49	7.4±0.49	7.4±0.49	7.1±0.70	7.4±0.49
2	F	7.2±0.42	7.2±0.42	7.3±0.46	7.2±0.66	7.4±0.49
	(0-4)					
	RT	7.1±0.53	7.0±0.39	7.1±0.47	6.8±0.53	6.9±0.54
	(25-34)					
4	37	7.0±0.53	6.6±0.49	6.6±0.49	6.2±0.53	6.3±0.46
	F	7.2±0.93	7.1±0.50	7.3±0.46	7.2±0.60	7.4±0.66
	(0-4)					
	RT	7.0±0.94	6.9±0.73	7.1±0.30	7.0±0.57	6.9±0.30
6	(25-34)					
	37	6.9±1.0	6.6±0.50	6.6±0.50	6.0±0.65	6.3±0.45
	F	7.2±0.85	7.1±0.62	7.2±0.48	7.1±0.65	7.2±0.69
	(0-4)					
6	RT	7.0±0.92	6.7±0.75	6.9±0.42	6.9±0.62	6.7±0.42
	(25-34)					
	37	6.9±0.93	6.4±0.60	6.3±0.72	5.8±0.72	6.0±0.82

* On nine point Hedonic Scale.

Table 4. Change in Thiobarbituric acid (TBA) value of Dehydrated Sprouted Green Gram and Spice Mix during Storage.

Storage period months	TBA Value (mg Malanaldehyde/Kg)					
	Sprouted Green Gram			0-4°C	Curry Mix	
	0-4°C	RT	37°C		RT	37°C
		(20-34°C)			(20-34°C)	
2	0.08	0.10	0.11	0.10	0.11	0.12
4	0.08	0.11	0.13	0.11	0.15	0.17
6	0.10	0.12	0.15	0.11	0.18	0.21

Initial Value : Sprouted green gram - 0.07
Spice mix - 0.10

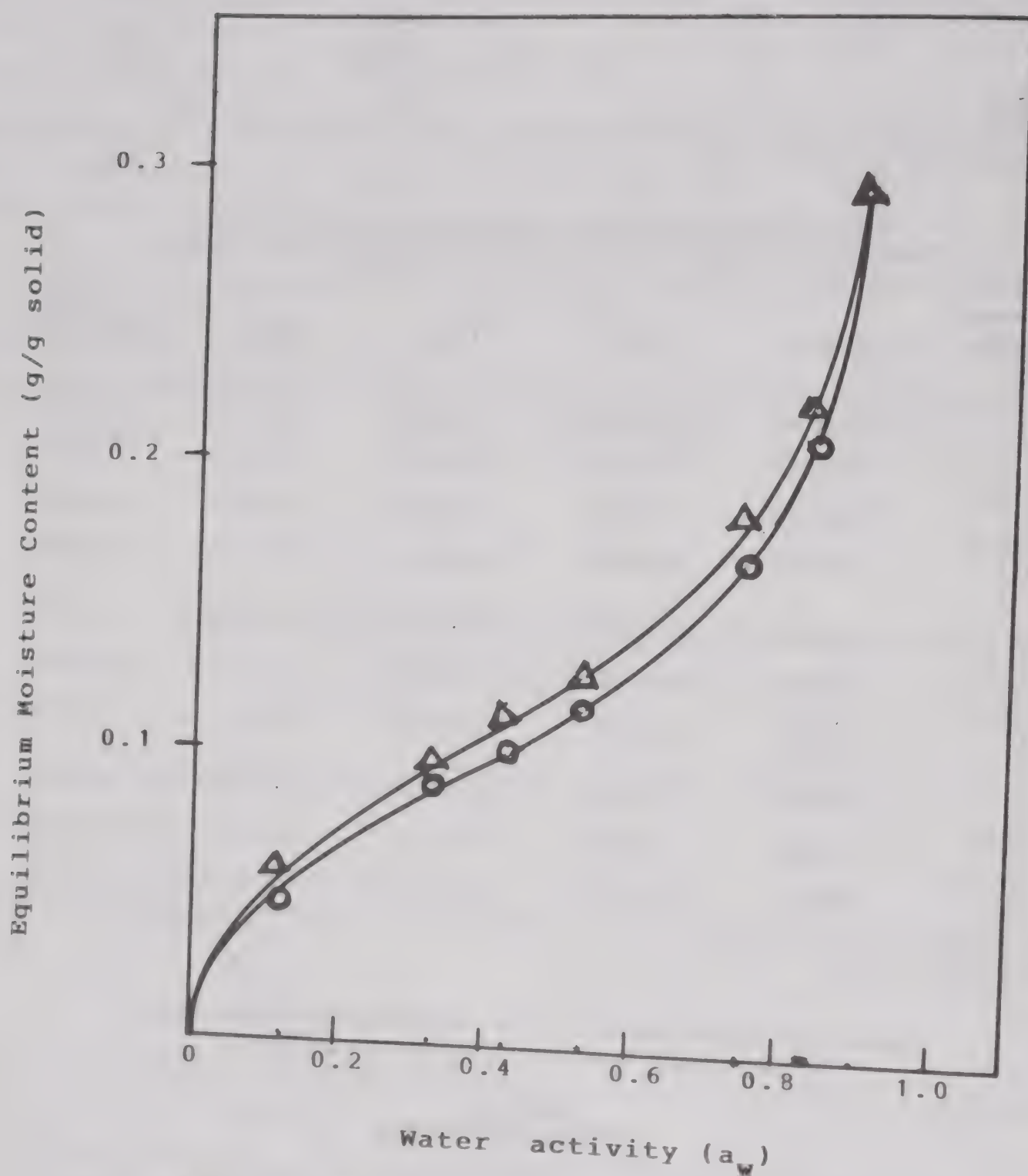


Fig.1. Moisture sorption isotherm of raw green gram (Δ — Δ) and dehydrated sprouted green gram (\circ — \circ) at 25°C

STUDIES ON THE PREPARATION AND STORAGE OF INTERMEDIATE MOISTURE RIPE MANGO SLICES OF *DASHEHARI* CULTIVAR

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ABSTRACT

The principle involved in the preservation of Intermediate Moisture Food (I.M.F.) is lowering of water activity by addition of solutes such as glycerol, sucrose or glucose etc. and retarding the microbial growth by addition of antimicrobial agents such as potassium sorbate and potassium metabisulphite. Studies conducted so far on most fruits involved use of glycerol upto 42.33 percent in soak infuse solution, affecting the flavour, taste and economy of the finished product. Hence, attempts were made in this study to prepare I.M. Ripe Mango slices, using lower levels of glycerol. Evaluation showed that mango slices which were steeped overnight in 68°B sugar syrup containing 2.0 percent glycerol, 0.2 percent citric acid, 0.2 percent K.M.S., drained and dehydrated at 60°C for 2 hours were liked most in comparison to samples, where 4 and 8 percent glycerol was used. Storage studies showed that keeping the product below 75.5 percent R.H. (31.67 percent equilibrium moisture content) was conducive to the retention of colour, flavour and texture of the product.

INTRODUCTION

Intermediate Moisture Foods (I.M.F.) are partially dehydrated foods with moisture content in the intermediate range, i.e. 20-50 percent and are stabilized by using suitable additives to keep the water activity low at safe levels (0.6-0.85) from the angle of microbiological spoilage. The concept behind the development of such foods is that one need not to dehydrate foods to 5-10 percent moisture level dictated by microbiological stability (Vijayraghavan, 1980). Further there will be substantial reduction in drying and reconstitution time and better retention of original flavour and texture compared to conventional hot air dried stuff. The principle involved in the preservation of

I.M.F. is lowering of water activity by addition of solutes such as glycerol, sucrose or glucose etc. and retarding the microbial growth by addition of antimicrobial agents such as potassium sorbate and potassium metabisulphite, etc. Studies conducted so far on guava, pineapple, mango by Jayaraman et al, (1974, 1975, 1976), banana by Ramanuja and Jayaraman (1980) and on carrot preserve by Sethi and Anand (1982), involved the use of glycerol upto 42.33 percent in soak solution affecting the flavour, taste and economy of the finished product. Patil and Singh (1998) have also mentioned that glycerol which is an ideal solute for I.M.F imparts unfamiliar taste. Hence, attempts were made in this study to prepare I.M. Ripe mango slices, using lower levels of glycerol with

sugar syrup and putting the drained slices in the dehydrator for a short time.

MATERIALS AND METHODS

Just ripe fruits of uniform size, firm texture and uniform maturity of *Dashehari* cultivar were purchased from local market and were studied for their physical and chemical characters.

The mangoes were washed, peeled and cut into slices and recovery percentage noted. The slices were subjected to the following treatments before putting for dehydration :

1. Untreated Control (Slices put in dehydrator as such).
2. Mango slices dipped in hot sugar syrup of 70°B.

3. Mango slices dipped in hot sugar syrup of 68°B containing 2 percent glycerol.
4. Mango slices dipped in hot sugar syrup of 65°B containing 5 percent glycerol.
5. Mango slices dipped in hot syrup of 62°B containing 8 percent glycerol.

The sugar syrups were prepared by calculating the amount of sugar needed and 0.2 percent citric acid was added in every lot for the clarity of the syrup and to check any chance of crystallization.

The steeping wherever envisaged was done for 20 hours and fruit to steep solution ratio was kept 1:1. The initial temperature of steeping was kept 80°C and on cooling to room temperature, 0.2 percent K.M.S. (Potassium Meta Bisuphite) was added in steeped solution.

The slices were then drained thoroughly over stainless steel wire mesh and weighed. Drained slices were dehydrated in a cross flow cabinet drier at 60°C for 2 to 6 hours depending upon the treatment. The periodic reduction in weight during dehydration after every half an hour was noted. The slices were placed in 250 gauge polythene bags, heat sealed, placed inside friction top tin containers and stored at room temperature (22 to 35°C).

Cut out examination of the sample was done immediately after dehydration and again after six months of storage. Peel, slices and stone (kernel) percentage was

calculated by dividing the weight of peel, slices and stones separately by the total weight of the fruit and multiplying by one hundred. Total soluble solids were determined by hand refractometer after pulping the fruit and squeezing out the juice through muslin cloth. Moisture percentage was determined by drying the pulp to a constant weight in an electric oven at 65°C. Titrable acidity, sugars and free sulphur-di-oxide (in parts per million) were estimated by A.O.A.C. (1985) methods. Equilibrium relative humidity (E.R.H.) of intermediate moisture mango slices was calculated by Wink's (1946) Weight Equilibrium Method. Organoleptic evaluation was done by a panel of six members of the Institute following Ranganna's (1978) composite scoring test.

RESULTS AND DISCUSSION

Recovery percentage of peel, slices and stone (after cutting slices) of mangoes is depicted in Table-I. After removal of the slices from the stone for the experimental purpose, 16.3 percent pulp remained attached with the stone.

Mango slices were found to contain T.S.S. of 21°B, moisture 76.8; acidity 0.16, reducing sugars 3.12 and total sugars 19.65 percent which were in conformity with Rao and Roy (1980).

Steeped Mango Slices

Alteration in soak syrup T.S.S., volume and weight of mango slices on steeping in different treatments was recorded in Table-II. The decline in weight of mango slices in various treatments was found in

between 27 to 30 percent, while Mehta et. al (1982) and Tomar et. al (1990) recorded 37.9 and 40 percent in osmotic dehydration of pineapple and pear respectively. The decline percentage was reported higher by Bongirwar and Sreenivasan (1977) in osmotic dehydration of banana by using soak solution in higher ratio. T.S.S. of the soak solution declined more where higher percentage of glycerol or lower concentration of sugar syrup was used.

The chemical constituents of mango slices after draining from the soaking solution are depicted in Table-III. Acidity, reducing and total sugars in all the cases were found increased in comparison to fresh slices. The slices retained 80 to 85 percent of sulphur dioxide added in parts per million (ppm).

Intermediate Moisture Mango Slices

The data on change of moisture content in drying of the drained slices of various treatments, are given in Table-IV. The control samples took six hours to reach 12.30% moisture while osmotically treated slices (T.No.2) took four hours to reach 16% moisture level. Glycerol treated samples, however, took 2 to 2.30 hours to reach a moisture level between 24.50 to 27.95%. The data also show that the treatment which contained lower amount of glycerol took more time in drying than samples which contained higher amount of glycerol. Glycerol treated samples were also found to retain more moisture in comparison to control and osmotically dried samples. Control and osmotically treated

samples were dried to a lower (conventional) moisture level to avoid the chances of spoilage (Table V).

As the slices which were put in drier contained less moisture in comparison to soaked slices, the various constituents after dehydration were noted higher (Dry Weight Basis). The control treatment was found to contain more acidity in comparison to other treatments as it was more dried and contained 12.30% moisture. Not much variation was observed in acidity in glycerol treated samples. Slight decrease in acidity was observed after 6 months of storage which was in conformity with Mir & Nath (1993).

The reducing sugars in I.M. slices were found approximately twice just after drying in comparison to soaked slices. The reducing sugars showed a slight increase during storage, which was probably due to acid hydrolysis of sucrose. Ammu et al (1977) had also reported an increase in reducing sugars during storage of freeze dried mango powder. Total sugars were also approximately two and half times higher in the slices after dehydration. Slight variation was recorded in total sugars during storage (Table-V). The retention of free sulphur-di-oxide initially in I.M. Slices was found to be similar to the soaked slices, though losses were observed during storage, which could be due to reaction of sulphur-di-oxide with constituents such as sugars, pectins, protein, lipid etc. or due to oxidation or volatilisation.

Organoleptic Evaluation

Organoleptic evaluation showed that the mango slices which were soaked in 68°B sugar syrup

containing 2% glycerol were liked most on draining and after partial dehydration obtaining 83% marks. These slices were found significantly better in flavour and texture over osmotically dried samples (T.No.2); however, these differences were non-significant as far as colour and taste were concerned. I.M. Slices with added 5% glycerol solution was rated second obtaining 80.54% marks having non-significant difference in all the characters with 2% added glycerol. Non-significant differences also existed between the slices of 8 and 2% added glycerol samples except the flavour where significant difference was observed. This observation was in conformity with the findings of Prabhakar et al (1992) who attributed undesirable changes in Intermediate Moisture Meats to the presence of higher levels of glycerol. Control samples obtained lowest liking in this study (Table VI).

Packaging and Storage Studies

The study of the equilibrium relative humidity was conducted on the I.M. Ripe Mango Slices which were partially dehydrated after soaking in 68% sugar syrup containing 2% glycerol for 20 hours. The initial moisture content of the slices was 25%. The relationship between equilibrium moisture content, number of days the product took to reach equilibrium at a particular relative humidity and the general condition of the product at different relative humidities is presented in Table-VII. Humidity moisture equilibrium curve for the product is given in Fig. I. The nature of

the equilibrium adsorption isotherm obtained at R.T. was sigmoidal type which was in conformity with findings of Deshpande and Tamhane (1981). It is evident that higher humidities stimulated moisture pick up resulting in deteriorative changes; thus mango slices stored at 100% R.H. turned mouldy after six days and at 86.5% R.H. in 16 days. At lower relative humidities there was moisture loss and the slices become gradually hard. No mould growth was noticed at 31.67% equilibrium moisture content (R.H. 75.5%) in slices even after 90 days of storage, while Rao and Roy (1980) observed mould growth in mango sheet at 18.85% equilibrium moisture content after 23 days. The studies thus showed that keeping the product below 75.5% R.H. was conducive to the retention of colour, flavour and texture of the Intermediate Mango Slices of *Deshehri* cultivar having 25% moisture. It is also clear that even the use of a small percentage of glycerol can help in extending the shelf life of the product.

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Table 1: Percentage Recovery of Peel, Slices and Stone of *Deshehri* Cultivar

Contents	Weight (kg)	Recovery (%)
Mango	5.000	--
Peel	0.615	12.20
Stone	0.560	10.20
Slices	3.000	60.00
Pulp attached to stone	0.815	16.30

Table II. Changes In Syrup Volume, T.S.S. and Weight of Slices after Steeping in Soaking Solution.

Treatment No.	T.S.S. of steeping solution (°B)	Wt of slices steeped (g)	Vol. of the Syrup used (ml)	Wt of slices after 20 hours (g)	Weight reduction in slices (%)	T.S.S. of Syrup after steeping	Vol. of Syrup after Steeping (ml)
-	-	-	-	-	-	-	-
70	1000	1000	1000	726	27.5	50	1200
70	500	500	500	352	29.6	52	630
70	500	500	500	365	28.6	50	620
70	500	500	500	350	30.0	45	640

Table III. Chemical Constituents of Mango Slices after Draining from Soak solution (Before putting in drier)

Treatment No.	Acidity (as C.A.) (%)	Red. Sugars (%)	Total Sugars (%)	SO ₂ (ppm)
-	-	-	-	-
	0.28	6.25	25.67	850
	0.30	6.00	23.43	800
	0.32	5.93	22.93	830
	0.33	5.38	22.40	850

Table IV. Periodic weight loss in different Treatments during Drying.

Time in (Hour)	Treatment No.				
	1	2	3	4	5
Initial weight of slices (g)	500	700	330	348	320
Wt. after 0.30 hour	"	610	310	330	310
Wt. after 1.00 hour	"	420	575	300	280
Wt. after 1.30 hour	"	"	530	285	270
Wt. after 2.00 hour	"	270	520	265	255
Wt. after 2.30 hour	"	"	520	260	240
Wt. after 3.00 hour	"	205	475	250	"
wt. after 3.30 hour	"	-	460	-	"
Wt. after 4.00 hour	"	175	"	"	"
Wt. after 5.00 hour	"	150	"	"	"
Wt. after 6.00 hour	"	135	"	"	"

Table V. Chemical constituents of Mango Slices just after Partial Drying and after Six months of storage.

Treatment No.	Moisture (%)		Acidity (%)		Reducing Sugars (%)		Total Sugars (%)		SO ₂ (ppm)	
	A	B	A	B	A	B	A	B	A	B
1.	12.30	11.80	0.45	0.43	13.21	13.86	62.54	62.00	-	-
2.	17.25	16.50	0.35	0.33	11.66	13.32	65.54	65.00	860	564
3.	24.50	21.25	0.38	0.34	11.36	13.32	63.42	62.98	792	562
4.	25.40	24.00	0.37	0.33	11.66	13.32	61.54	60.72	760	564
5.	27.95	26.50	0.38	0.33	11.66	13.50	65.40	60.00	760	562

A- Just after partial drying

B-After six months of storage

Table VI. Mean Score Value of Organoleptic Evaluation of Mango Slices

Treatments Characters	1	2	3	4	5	S.E.	C.D.at 5%
Colour	19.00	19.74	20.14	19.94	19.00	± 0.76	1.52
Flavour	18.14	18.97	21.00	20.47	19.14	± 0.74	1.47
Texture	17.74	19.29	20.64	20.02	19.79	± 0.69	1.38
Taste	18.26	20.17	21.26	20.11	20.00	± 0.64	1.26
Total	73.14	78.17	83.00	80.54	78.93		

S.E. - Standard Error

C.D. - Critical Difference

Table VII. Equilibrium Relative Humidity data for Intermediate Moisture Mango Slices at R.T. (30-32°C)

Equilibrium Moisture Content (%)	Equilibrium Relative Humidity (%)	Number of days required to reach Equilibrium	Remarks
1.31	2.00	29	Product very hard, colour good.
1.52	11.10	27	----- do -----
2.17	22.90	25	----- do -----
3.04	32.90	23	Product hard, colour good.
4.65	43.90	20	----- do -----
7.54	53.50	22	----- do -----
13.74	64.80	19	Texture good, colour good
31.67	75.50	17	Texture excellent, colour good.
41.24	86.50	--	Mould growth after 16 days
43.00	100.00	--	Mould growth after 6 days

STUDIES ON BLENDING OF GUAVA AND PAPAYA PULP FOR RTS BEVERAGE

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ABSTRACT

Blending of 'Lucknow-49' guava and 'Solo' papaya pulp (20-40 per cent) was studied for preparation of ready-to-serve (RTS) beverage to improve colour, flavour and overall acceptability of drink. RTS beverage having 15 per cent pulp, 14°Brix T.S.S. and 0.3 per cent acidity as citric acid was prepared, filled in cleaned pasteurized bottles and heat processed at 90°C temp. for 20 min. Physico-chemical analysis and sensory quality of RTS beverage was done at initial (0) and after six months of storage at room temperature (20-30°C). Vitamin-C content was highest (28.1 mg/100g) in pure guava while carotene content was maximum (441.6 µg/100g) in pure papaya beverage. Sensory quality score was highest in guava and papaya blend (70:30) due to better consistency and flavour. It also contains fair amount of Vitamin-C (24.7 mg/100g) and carotene (303.7 µg/100g). Further, the RTS was found acceptable after six months of storage at room temperature.

INTRODUCTION

India is the largest producer of fruits in the world, but less than 2 per cent of the total produce is being utilised for making processed fruit products. Guava and Papaya are the two important fruit crops grown over an area of 1,31,625 hectares and 60921 hectares with an annual production of approximately 15 and 13 million MT respectively (Negi *et al.* 1988).

Guava is rich in Vitamin-C and available twice a year while papaya fruits are rich in carotene and available throughout the year in India. Commercially available guava juice prepared specially from white flesh guava has poor storage life. This is mainly due to loss of colour, flavour and browning in the juice. On the other hand, the typical strong flavour of papaya juice developed after processing will

not be liked by many consumers. It is reported that blending of fruit juices helps in improving nutrient elements, reducing cost of production by using cheaper fruits in the blends and also leads to new product development (Kalra *et al.*, 1981). Fruits which are rich in nutrients but are not accepted due to high acidity or poor taste and flavour can be blended with other fruits to improve their acceptability and make use of available nutrients (Khan *et al.*, 1988). Efforts to make various blended fruit drinks have been made using mango and pineapple (Gegum *et al.*, 1983), Mango and Papaya (Kalra *et al.*, 1991 and Gowda, 1995) and other fruits (Khan *et al.*, 1988). In the present investigation an attempt has been made by blending the two fruit pulps in different combinations to produce an acceptable quality ready-to-serve

beverage having increased shelf life compared to juices prepared from individual fruit types.

MATERIALS AND METHODS

Raw material: Fully mature guava fruit of cv. 'LUCKNOW-49' and PAPAYA VAR. "Solo" were harvested from the farms of Indian Institute of Horticultural Research. After ripening at room temperature pulps were prepared and used for blending studies during 1992-95. Guava fruits were first washed under running tap water, lye peeled in 2% NaOH solution (boiling) for 1.5 minutes, cooled by dipping in cold water and then thoroughly washed in running water to remove NaOH. Peeled fruits were cut into small pieces and blended in an electric blender, adding ascorbic acid @ 1000 mg/kg of fruit pieces to prevent browning, passed through a stainless steel sieve of 30

mesh to remove seeds and fruit pieces. Papaya pulp was extracted after removing the seeds and skin. Both the pulps were stored at -40°C for further use.

Preparation of juice : Before making RTS beverage, guava and papaya pulps were analysed for Total Soluble Solids (TSS°Brix) and acidity (as per cent citric acid). Guava and papaya pulps were blended at 20:80, 30:70 and 40:60 (w/w) ratios. From individual pulps and these three blends, RTS beverages having 15% pulp, 14°Brix TSS and 0.3% acidity were prepared. RTS beverages from individual pulps were used as control treatments. These prepared beverages were heated to 85°C, poured into sterilised 200 ml bottles, sealed with crown cork, heat processed by dipping in boiling water for 20 minutes and stored at room temperature for further studies. The experiment was repeated three times.

Physico-chemical composition : Above pulps and RTS beverages were subjected for physico-chemical analysis for TSS (°Brix), Titratable acidity (%), pH, Vitamin-C, Carotenoid content, Viscosity and NEB (OD at 440nm). Sugars were analysed immediately after extraction and at the end of storage period by the standard methods (Ranganna, 1986).

Sensory evaluation of RTS beverage : Organoleptic properties of bottled RTS beverages were evaluated by a panel of 10 judges using hedonic scale having scores for colour (30), Consistency (30), Flavour (40).

Statistical Analysis : All data were analysed statistically using a Randomised Block Design (RBD) as per Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Physico-chemical composition : Chemical composition of guava pulp var. 'Lucknow-49' and papaya pulp var. 'Solo' used in the study is given in Table 1. In guava pulp, the TSS was 9.5 and 9.7° Brix and acidity (as citric acid) was 0.63% and 0.75% during first and second year of experimentation respectively. In papaya pulp, TSS was 12.0°Brix and acidity (as citric acid) 0.2% during both the years. However, variation in Vitamin-C and carotenoid contents was observed in different years.

Data on physico-chemical composition of RTS beverage as influenced by blends of pulp is presented in Table 2. Significant differences were observed in case of Vitamin C, carotenoid content and viscosity of the beverages at initial as well as after six months of storage at RT (20-30°C temp.). Vitamin-C content was maximum in case of pure guava beverage (28.1 mg/100g) while pure papaya beverage recorded highest carotenoid content (441 µg/100g). Blending of papaya with guava significantly improved the carotenoid content in RTS beverage. Differences in TSS, acidity and pH were non-significant as the final TSS and acidity of the beverages were adjusted before processing. Analysis carried out after six months of storage at RT indicated a general

loss in vitamin-C as well as crotenoids and increase in reducing sugars and browning in the samples. These results are in conformity with the observations made by Kalra and Tandon (1984) with guava and mango blends and Gowda (1995) in the case of mango and papaya blends. Similar results were observed during the second year of experimentation (Table 3).

Sensory qualities : Data on sensory qualities of bottled RTS beverages initially and after of six months storage are presented in Table 2. Significant differences were observed for consistency, flavour and overall acceptability before as well as after the storage period. However, for colour, differences were nonsignificant.

RTS beverage of 70% guava and 30% papaya blend recorded highest score for consistency and flavour while score for colour was at par with other blends. The overall acceptability score was maximum in 70% guava + 30% papaya blend followed by pure guava juice and its was lowest in case of pure papaya juice. These observations indicate that the overall quality of guava or papaya beverage can be improved significantly by blending. At the end of the storage period, although there was reduction in overall acceptability of all juices, the superiority of 70% guava + 30% papaya RTS beverage was maintained. Similar results were observed in second year (Table 3). Reduction in sensory quality score after storage period has also been recorded by Murari and Verma (1987) in case of guava nectar and

by Gowda (1995) in case of mango and papaya blend.

Based on the results of this two year studies, it is concluded that blending of 30% of papaya pulp with 70% guava improved the nutritional as well as sensory qualities of RTS beverage which was found acceptable upto six months at room temperature (20-30°C).

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Table-1 Physico-chemical composition of guava and papaya pulp used for RTS beverage

Parameters	Guava Pulp		Papaya pulp	
	1993-94	1994-95	1993-94	1994-95
T.S.S. (°Brix)	9.50	9.70	12.00	12.00
Acidity (%)	0.63	0.75	0.20	0.20
pH	3.65	3.28	4.41	4.41
Vitamin-C (mg/100 g.)	224.0	210.2	52.5	50.6
Red. Sugars (%)	4.23	4.00	6.10	5.90
Non-red. Sugars (%)	1.42	1.51	1.21	1.10
Total Sugars (%)	6.65	5.51	7.31	7.00
Carotenoids (µg/100g)	—	—	18050	16125

Table 2: Physico-chemical composition and sensory qualities of blended guava and papaya RTS beverage at initial and after 6 months of storage at room temperature (1994-95)

Treatment	T.S.S. (°Brix)	Acidity (%)	pH	Vit.C (mg/100 g)	Carotene (µg/100g)	Red. sug.(%)	Total sug. (%)	Viscosity (cps)	NEB	Sensory Score				
										Colour [30]	Consistency [30]	Flavour [40]	Total [100]	
Before storage														
100% G+20	15.6	0.28	3.14	23.3	275	8.8	14.6	17.2	0.025	22.8	21.0	24.0	67.8	
70% G+30	16.2	0.29	3.16	20.5	351	8.2	15.0	16.6	0.021	24.0	22.2	28.2	74.4	
60% G+40	15.8	0.27	3.19	17.0	405	6.8	14.4	15.2	0.016	23.0	21.4	24.0	69.4	
G only	16.4	0.28	3.13	27.1	0	7.3	13.7	24.2	0.022	23.2	22.0	25.2	70.4	
P only	16.4	0.29	3.22	13.8	450	8.5	14.2	9.2	0.017	24.0	16.4	20.2	60.6	
SEM ±	0.3	0.01	0.02	0.5	8	0.3	0.2	1.2	0.002	0.6	0.5	0.4	1.2	
CD at 5%	N.S.	N.S.	N.S.	1.6	27	0.9	0.7	4.0	N.S.	N.S.	1.6	1.1	3.9	
After six months of storage														
80% G+20	16.8	0.27	3.30	17.5	120	14.3	15.5	17.1	0.049	20.0	22.2	23.6	63.8	
70% G+30	17.2	0.28	3.32	16.5	130	14.1	14.5	18.2	0.043	22.6	20.2	26.8	69.6	
60% G+40	15.8	0.27	3.36	13.0	200	14.0	15.2	15.1	0.042	19.2	20.0	23.2	62.4	
G only	16.6	0.26	3.26	23.4	0	14.6	15.2	23.2	0.048	20.4	21.0	24.2	65.6	
P only	16.4	0.27	3.30	10.0	410	12.3	13.1	9	0.041	23.0	15.2	16.8	55.0	
SEM ±	0.9	0.01	0.03	0.6	7	0.3	0.2	0.7	0.001	0.3	0.6	0.2	1.3	
CD at 5%	N.S.	N.S.	N.S.	2.1	24	0.9	0.6	2.2	0.003	0.8	2.0	0.8	4.4	

G=Guava
P=Papaya
N.S.=Nonsignificant

Table 3: Physico-chemical composition and sensory qualities of blended guava and papaya RTS beverage at initial and after 6 months of storage at room temperature (1993-94)

Treatment	T.S.S. (°Brix)	Acidity (%)	pH	Vit.C (mg/100 g)	Carotene (µg/ 100 g)	Red. sug.(%)	Total sug. (%)	Viscosity (cps)	NEB	Colour [30]	Consisten [30]	Sensory Score Flavour [40]	Total [100]
Before storage													
80% G+20% P	16.0	0.26	3.03	25.3	259	7.0	14.2	13.5	0.022	22.6	21.2	23.4	67.2
70% G+30% P	16.2	0.27	3.03	24.7	303	6.5	14.0	12.2	0.022	23.4	22.0	27.2	72.6
60% G+40% P	16.4	0.26	3.02	20.3	395	6.7	14.5	10.1	0.024	23.8	21.0	24.8	69.8
G only	15.0	0.29	3.02	28.1	0	6.8	13.8	11.6	0.023	23.6	21.6	24.8	70.0
P only	16.8	0.28	3.04	9.4	441	6.2	14.8	4.2	0.024	24.2	16.0	19.8	60.0
SEM ±	0.4	0.01	0.06	1.0	9	0.2	0.4	0.3	0.001	0.5	0.5	0.4	0.9
CD at 5%	N.S.	N.S.	N.S.	3.0	30	N.S.	N.S.	1.1	N.S.	N.S.	1.5	1.2	3.0
After six months of storage													
80% G+20% P	16.0	0.27	3.18	17.6	140	12.2	14.3	13.2	0.032	20.4	20.0	24.0	64.4
70% G+30% P	16.3	0.29	3.19	17.4	176	11.2	13.8	11.4	0.027	22.2	20.1	26.0	68.3
60% G+40% P	16.5	0.28	3.12	13.2	185	12.1	14.2	9.9	0.027	19.8	20.2	23.5	63.5
G only	15.2	0.29	3.16	20.4	0	11.8	13.6	11.6	0.036	22.2	20.8	23.8	64.8
P only	16.6	0.29	3.16	7.3	206	12.9	14.6	4	0.027	23.2	15.0	17.2	55.4
SEM ±	0.3	0.01	0.02	0.7	4	0.5	0.3	0.5	0.002	0.4	0.4	0.4	1.4
CD at 5%	N.S.	N.S.	N.S.	2.2	14	N.S.	N.S.	N.S.	N.S.	1.2	1.3	1.3	4.7

G=Guava
P=Papaya
N.S.=Nonsignificant

STUDIES ON STORAGE OF DEHYDRATED ONION FLAKES

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ABSTRACT

A storage study was undertaken for the Pusa white onion flakes dehydrated at 60°C with 0.3 percent potassium metabisulphite level. To study the shelf life, the onion flakes were packed in 300 gauge polyethylene bags and storage studies were carried out by adopting three methods of storage namely vacuum storage, storage in polyethylene bags filled with nitrogen and control storage. During the storage period of three months, the bio-chemical changes and organoleptic analyses were carried out at monthly intervals, which showed a significant reduction in ascorbic acid in all the methods of storage and the reduction was comparatively higher in control. The total sugar content was significantly higher in control and the change in non-enzymatic browning was significantly lower in vacuum storage method. From the organoleptic study, it was found that the dehydrated onion flakes could be used for consumption up to one month. A progressive increase in moisture content and reduction in rehydration ratio were also observed during the storage period. Detailed storage analyses are presented in this paper.

INTRODUCTION

Dehydrated products also deteriorate when they are exposed to open atmosphere with high moisture content. This deterioration can be avoided by effective method of packaging and storage (Crosby, N.T.1981). The main aim of packaging is to ensure that the products reach the consumer in a sound condition. The present study was taken up with a view to increasing the shelf life of dehydrated onion flakes by packing in polyethylene bags and storing under different conditions.

MATERIALS AND METHODS

Pusa white round onion bulbs were sliced at right angles to the vertical axis to obtain slices of 4-5 mm thickness. These slices were treated with 0.3% potassium meta

bisulphite solution and dehydrated at 60°C. (Kumar and Sreenarayanan, 1998).

Packaging and Storage studies

The dehydrated flakes were packed in 300 gauge polyethylene bags and storage studies were carried out by adopting three methods of storage, namely, vacuum storage, storage in polyethylene bags filled with nitrogen and control storage for three months.

Vacuum storage

The dehydrated flakes were packed in polyethylene bags. By using automatic vacuum heat sealing machine, vacuum was created and immediately heat sealed. The vacuum pump pressure was kept constant at 300 mm. Hg. After vacuumization, the bag was

completely attached around the dehydrated onion flakes.

2. Storage in polyethylene bags filled with nitrogen

After packing dehydrated onion flakes in polyethylene bags the vacuumisation procedure was carried out as in vacuum storage method. Then nitrogen gas was injected into the vacuum created bags through the injection needle. Finally the needle hole was also heat sealed by using heat-sealing machine.

3. Control storage

The dehydrated samples were packed in polyethylene bags and then simply heat sealed. During the three months storage period the physico-chemical changes were observed at monthly intervals

(Osborne and Voogt., 1978).

Ascorbic acid content was estimated by titrating a known weight of the sample with 2,6 dichlorophenol indophenol dye. Total sugars in onion flakes was determined by taking an aliquot of the clarified extract following hydrolysis with hydrochloric acid and neutralisation of the excess acid with sodium carbonate (Sadasivam, 1990). Browning in dehydrated onion was measured in terms of optical density at 420 nm by taking an aliquot extract of 100% alcohol (Kalra 1987).

An organoleptic evaluation of rehydrated onion slices was performed in terms of colour, texture, pungency and overall acceptability by a panel of five judges in a 9 point hedonic scale varying from 'like extremely' to 'dislike extremely' (rating 1) after 30, 60 and 90 days of storage. (Ranganna, 1979).

RESULTS AND DISCUSSION

Physico-chemical changes were analysed by using factorial RBD. The results are presented in Table.1 They revealed that the ascorbic acid content was significantly

reduced in all the methods of storage and the reduction was comparatively lesser in vacuum storage. This reduction may be due to the slow exposure of atmospheric oxygen. The sugar content slightly increased during storage, and the increase was comparatively higher in control storage. The change in browning was at very low level in vacuum storage followed by storage in polyethylene bag filled with nitrogen.

The moisture content increased marginally in all the methods of storage. This may be due to higher relative humidity and moderate water vapour transmission rate of the polyethylene bags. A reduction in rehydrating capacity of the flakes was also observed with increase in storage periods.

From the organoleptic study it was found that the dehydrated onion slices stored in 300 gauge polyethylene bags could be used for consumption up to one month. But after this period, the colour change increased significantly in all the methods of storage and as per the ratings of overall acceptability the consumer might not prefer it for consumption.



Conclusion

The shelf life of dehydrated onion flakes, packed in 300 gauge polyethylene film, stored under normal atmospheric conditions could be increased up to one month. From the overall observations it was concluded that the physico-chemical changes were comparatively lesser under vacuum storage method.

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Table 1 Chemical composition of dehydrated white onion flakes during storage.

Storage (days)	Storage methods	Final moisture content %	Ascorbic acid content (mg/100g)	Total sugar %	Non-enzymatic browning (O.D)	Rehydration ratio
While packing		5.55	6.76	4.91	45.20	5.12
30	C	5.62	6.74	4.95	47.50	5.10
	V	5.58	6.75	4.95	46.00	5.11
	N	5.59	6.75	4.94	47.00	5.11
60	C	5.71	6.40	4.97	50.00	5.08
	V	5.68	6.49	4.96	48.00	5.08
	N	5.70	6.45	4.96	47.00	5.08
90	C	5.85	6.09	5.11	50.00	5.06
	V	5.83	6.12	5.00	50.00	5.06
	N	5.84	6.11	5.02	51.50	5.05
	CD (5%)		0.006	0.004	0.9	

C: Control Storage

V: Vacuum Storage

N: Nitrogen filled bag Storage

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CONSUMER BEHAVIOUR TOWARDS FROZEN FRUIT & VEGETABLE PRODUCTS IN INDIA - A MARKET STUDY

P.L. Kaul

Mariental India Pvt. Ltd., New Delhi

1. Preamble

Dr. Joseph H. Hulse, a well known Canadian food expert and winner of world food prize, who was also instrumental in setting up CFIRI Training Centre, Mysore, says.

"Agro Industry using Technology which converted material from harvested crop and livestock into useful food and fibre, were the primary engines of economic developments in North America, Europe, Australia and New Zealand."

India has strong competitive advantage in food production in a way that is true of almost no other business. Food production and food processing accounts for 26% of the country's GDP and 60% of its employment. Fruits and vegetables sector in India is second largest in the world, accounting for 9% of world output. The annual production of fruit and vegetable in India is around 120 million tonnes. The food chain in India is fragmented and thus inefficient in the present form. Agro produce worth Rs. 35,000 crores amounting to about 20 million tonnes go into waste because of losses during storage and transport.

Preservation of Fruit and Vegetable products in fresh form

during harvesting so as to prevent losses and to make these available to the consumer round the year at uniform price, is an experience of immense importance for the natural economy and for the well being of rural masses and urban consumers. Individual Quick Frozen (IQF) is one such technique, which is the most popular in the developed world, to keep fruits and vegetables farm fresh all the time. The products because of the energy cost on refrigeration during storage, transit and retailing are somewhat expensive than the fresh produce but in the offseason, it is much lower than the products which are otherwise scarce.

India is a country with large middle income group population. The educational, economic and professional upliftment of this demographic segment offers the largest domestic market for such consumable products. The industrialization impacting the multiplier effect is further accelerating the consumerism in India. As a result the demand for processed fruit and vegetables has been increasing.

2. Market study objectives

A detailed market study was conducted by MMRG to estimate the total demand of IQF processed

fruits and vegetables in the country with a special emphasis on South Indian cities. The study aims to establish business opportunities for IQF processed fruits and vegetables. Despite being the products of daily consumption, the demand pattern at present seems to be receiving reluctance from traditional consumer perception.

The study has however been conducted to investigate the following multiple objectives :

- i. Consumer perception about acceptability of the IQF fruits and vegetables.
- ii. Judge the consumer food habits in terms of their income, profession and educational levels.
- iii. Quantify demand and demand pattern.
- iv. Evaluate industry status in India.
- v. Identify seasonalities of supply and its impact on the demand patterns.
- vi. Analyse price and price pattern.
- vii. Study the marketing practices, recommend the marketing mix and trade channels.

3. Methodology

For study conducted has been

normative but descriptive and conclusive in nature. The complexities of deliverables have pushed the study more towards the primary research than being only secondary research oriented.

4. Survey method

The study conducted has been through a set of questionnaires, designed separately for different target segments, both structured and semi-structured for allowing every little freedom to the respondents. The questionnaires have been executed through the personal interviews and investigations, numbering over 300 respondents.

5. Coverage

The coverage of the study has been decided on the basis of planned location; the emphasis has been laid on the South Indian cities which include Bangalore, Cochin, Coimbatore, Hyderabad, Chennai, Trivandrum, Vijayawada and Vizag. In addition to these cities the study has also covered the two metro cities of Delhi & Mumbai.

6. Sampling

Stratified random sampling with replacement, has been utilized for fair sample size. Taking into account a sampling error of $\pm 5\%$, the following sample size has resulted to be optimum:

S.No.	Target Segment	All India Sample
Coverage No.		
1	Households	150
2	Exporters	75

3	Institutions	60
4	Trade channels	25

The house hold segment comprises of sample, stratified on the basis of three major physiographic considerations, i.e. income, profession & educational level.

7. The Study

The Study relates mainly to find out market features of IQF fruits & vegetables in the processed form. The products studied in frozen and chilled form were:

A: Vegetables	B: Fruits
i. Cauliflower	i. Peeled orange
ii. Tomato	ii. Pineapple cubes
iii. Beans	iii. Banana
iv. Broccoli	iv. Papaya cubes
v. Okra	v. Mango cubes
vi. Drumsticks	
vii. Lettuce	
viii. Carrots	

Since IQF Green Peas has already established itself as a product of choice with the housewives in Indian metros, it has't been included amongst the vegetables for survey.

C. Green Salad in Disposable Bowl

The analysis of the extensive primary research data and its extrapolation for the current market demand of frozen fruits and vegetables and refrigerated green salad in cities of interest is summarised in graphs attached herewith.

8. Graphic Interpretation

Graph No.1: Barring Bangalore & Metro cities of Mumbai, Delhi & Chennai, the awareness quotient of IQF based fruits and vegetables

has been found to be negligible. All India bases of awareness quotient is about 27% as per MMRG survey.

Graph No2: It shows the per capita consumption of IQF processed fruits and vegetable products among various income categories. It is given to understand that consumption of such products is a direct function of levels of income through interestingly it is marginally lower among the highest income group.

Graph No3 : The Total net business opportunities in 2005 A.D. for both IQF fruits & vegetables in the selected cities shows that the demand is exponentially increasing.

Graph No4 : The net business opportunities in 2005 A.D. for IQF vegetables in the selected cities is maximum in metro cities of Mumbai, Delhi, & Chennai. Barring Bangalore all other cities have negligent demand. Among the IQF vegetables, tomato would enjoy the top share with about 16.7% strong hold followed by carrot at 19.3%, cauliflower at 15.5%, drumsticks with 13.4%.

Graph No5 : The net business opportunities in 2005 A.D. for IQF fruits in the selected cities shows typical demand pattern. The demand of Frozen Fruits is prominent in metro cities like Mumbai, Delhi & Chennai. Among the IQF frozen fruits mango would be the leader with 54.8% share followed by orange at 23.1% & pineapple with 15.7% & papaya.

In view of the enormous data generated, this article emphasizes only on the conclusion of the

findings of the primary research for the consumers' perception on various reasons for preference for the IQF processed foods among the various income groups.

The findings for the reasons (for preference) among the income groups have been highlighted in the tables mentioned below:

Reasons (For preference):

- R1=Being hygienic,
- R2=Freshness
- R3=Availability round the year
- R4=Price stability
- R5=Easy to cook
- R6=Choices of pieces and any shapes.

The actual finding of the primary research data has been consolidated in Table No. 1 which has been generated from the enormous data collected from the actual interviews conducted during field surveys.

9. Conclusion

The physiographic variables have been analysed, to find the acceptability of the IQF Fruit & Vegetable products. The acceptability norms are derived from a cross-section of stratified samples. In this study the stratification has been made in terms of various income levels.

The products under study are targeted for middle and higher income group of only urban areas, as it is impossible to establish, the distribution network in the rural belt. The urban population with middle and higher economic status are relevant market segments for the IQF, Fruit and Vegetable products.

In the case of IQF based processed vegetables hygiene and availability of the product during

off-season have emerged to be the key demand drivers. On the contrary IQF fruits in the processed form may be demanded for their freshness, hygiene and price stability. For green salad, hygiene and freshness appear to be key demand drivers. These factors are found to be effecting the consumer propensity to switch over. Although pricing appears to be the major constraint but not to the extent of affecting business volume. The demand projections, for IQF based products necessarily require an optimum projection of switch over probabilities, which otherwise are found to be exponential.

The experience of product launch in Delhi and Mumbai have revealed a multiplier effect on the acceptability and switch-over. This mainly may come from imitation, initial trials and awareness methods.



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Table No.1
Consumer Perception on Frozen Fruit &
Vegetable as A function of Income level

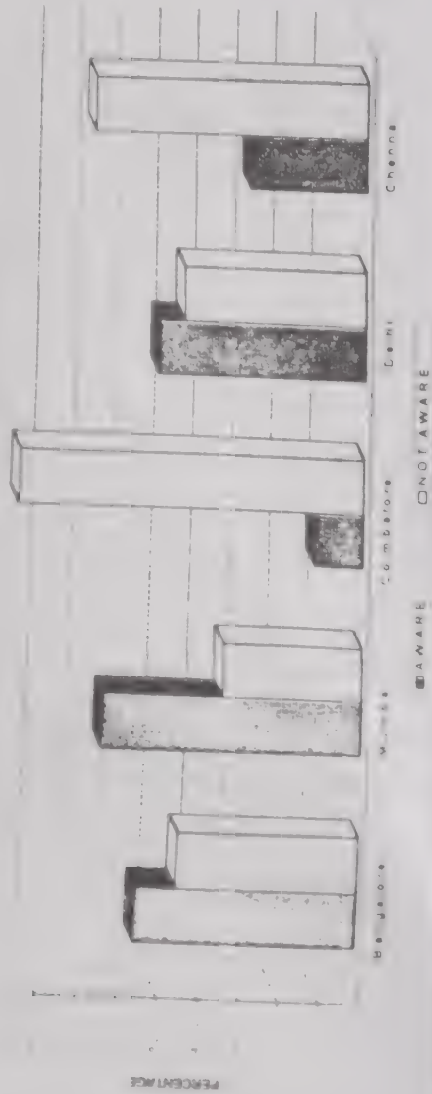
Sensory variables for IQF products	Income Group		Preference Perception %		
		Vegetables	Fruits	Salad	
Being Hygienic	Lower	N.I	40	N.I	
	Middle	10	40	11	
	Upper Middle	25	32	64	
	Higher	55	21	62	
	Affluent	35	33	49	
Freshness	Lower	50	N.I.	100	
	Middle	50	30	78	
	Upper Middle	N.I	21	36	
	Higher	6	29	23	
	Affluent	14	25	43	
Being Hygienic	Lower	50	N.I.	N.I	
	Middle	30	N.I.	11	
	Upper Middle	10	21	N.I	
	Higher	13	7	15	
	Affluent	17	11	8	
Being Hygienic	Lower	N.I	N.I.	N.I	
	Middle	N.I	11	N.I	
	Upper Middle	30	20	N.I	
	Higher	7	36	N.I	
	Affluent	15	20	N.I	
Being Hygienic	Lower	N.I	N.I.	N.I	
	Middle	10	N.I.	N.I	
	Upper Middle	15	N.I.	N.I	
	Higher	7	N.I.	N.I	
	Affluent	11	N.I.	N.I	
Being Hygienic	Lower	N.I	N.I.	N.I	
	Middle	N.I	16	N.I	
	Upper Middle	20	16	N.I	
	Higher	13	7	N.I	
	Affluent	13	11	N.I	

INCOME GROUPS: i. Lower Rs. 5,000 to 10,000
 iii. Upper Middle Rs 15,000 to 20,000
 v. Affluent Above Rs. 25,000

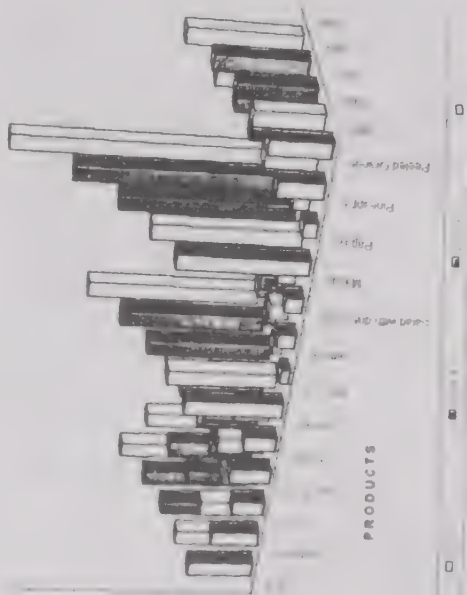
ii. Middle Rs. 10,000 to 15,000
 iv. Higher Rs. 20,000 to 25,000

NOTE: : Green salad is ready to eat, dispensed in easy to carry bowls
N.I. : Not Indicated

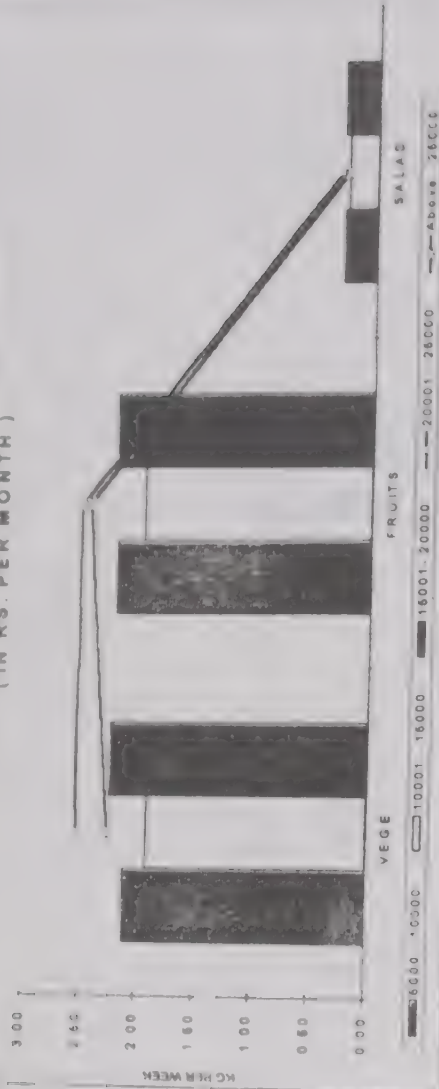
GRAPH NO. 1
AWARENESS LEVEL FOR DEEP FROZEN PRODUCTS



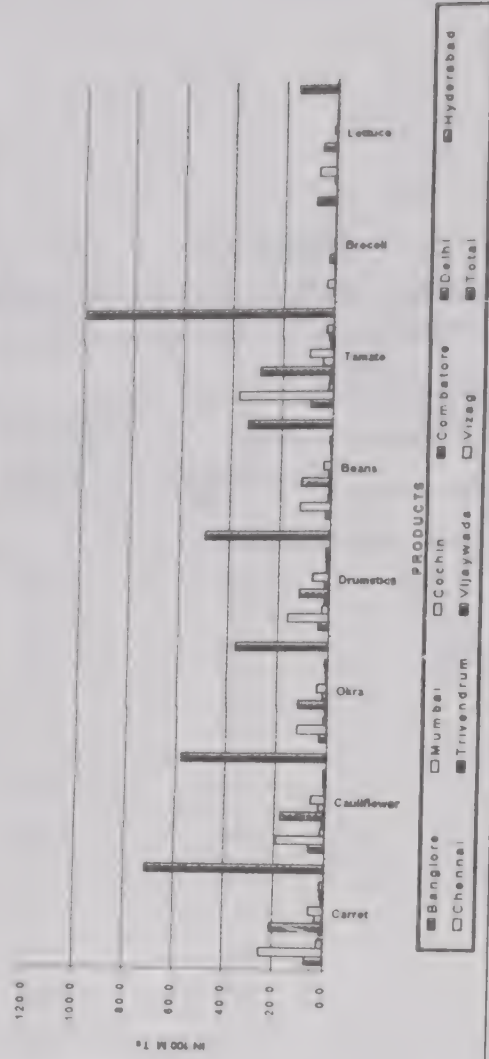
GRAPH NO. 3
PROJECTED TOTAL DEMAND FOR FROZEN FRUITS & VEGETABLES



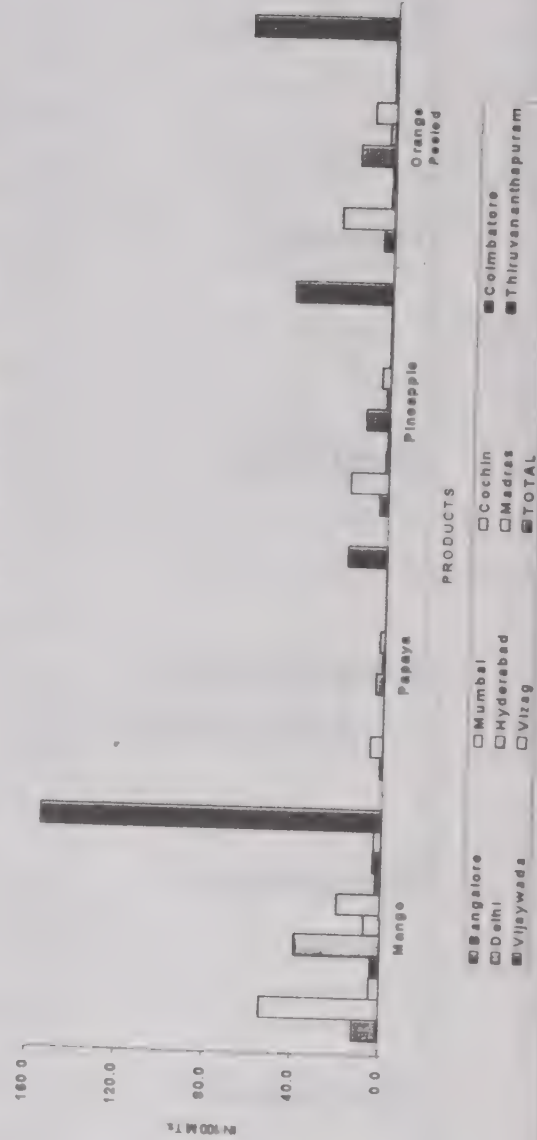
GRAPH NO. 2
PER CAPITA CONSUMPTION BY INCOME CATEGORY
(IN RS. PER MONTH)



GRAPH NO. 4
NET BUSINESS OPPORTUNITIES OF FROZEN VEGETABLES IN 2005 A.D.



GRAPH NO. 5
NET BUSINESS OPPORTUNITIES OF FROZEN FRUIT IN 2005 A.D.



GENERAL ARTICLES

'INDIA'S FOOD PROCESSING INDUSTRY - READY FOR A QUANTUM LEAP*

Sh. P.S.Bhatnagar

Secretary

*Ministry of Food Processing Industry
Govt. of India*

"When the foundation stone of the Central Food Technological Research Institute was laid in October 1950, it was envisioned that this institute would be in the vanguard of the quest for knowledge that would enable India to ensure the health and prosperity of its millions. At the threshold of the new century, it is very appropriate to take stock of the acquisition and dissemination of such knowledge by the institute. This should also provide an appropriate opportunity to the Food Processing Industry to make an assessment of its capability to use profitably any such knowledge and transform it into reality.

Food has a very wide connotation but it could be summed up as any plant or animal material which is consumed for nutrition and sustenance. The collection, preparation and distribution of food constitute the very basis of civilization, culture and home. Humanity has always recognized that the preservation of food to ensure its availability according to need is central to its concerns. Pickling, salting, drying and other methods of

Food Processing are almost as old as mankind itself. Let us take stock of the present situation of Food Processing in India and the prospects for the future. Food processing is a multifaceted endeavour and its further complexity lies in terms of the enabling environment; the status of production of the basic plant and animal material; the industry and the consumer; and the market.

The environment for the industry has substantially changed since 1991. Industrial licensing has been largely abolished and foreign investment, technology transfers and collaborations have been freely permitted. Import and excise duties have been brought down. As a result of these steps, the cumulative investment by all financial institutions in the Food Industry Sector has increased from about Rs. 6500 crore in 1992-93 to Rs. 18,500 crore at the end of 1997-98. An increase of almost 200%! Further, foreign investment of Rs.8886 crore has been cleared, of which Rs.2032 crore has been utilized. However, as a proportion of the total sanctions by the financial institutions to the

food industry has decreased from about 4 to about 2.5%. This apparent reduction is because of the very sharp increase in investment in the power sector and does not represent a trend.

In line with the market orientation of the financial regime, there has been significant relaxation in the regulatory regime. The Cold Storage Regulatory Order and the Rice Milling Regulations have been abolished. Steps are being taken to harmonize the provisions of the PFA Act and the Control Orders with the codex provisions. The government is committed to the removal of all quantitative restrictions on imports. A cursory glance at the markets in the principal metros reveals a variety of imported processed food products. A clear indication of the growing integration of the domestic and international markets. Looking from where we stand today it is clear that government policies at a macro level have been in a positive direction. Much, however, remains to be done.

There are anomalies in the duty structure and excise policy

Foundation Day Lecture delivered at CFTRI, Mysore and reprinted from CSIR News, 15, November 1999

which need to be resolved. Merely asking for reductions will not achieve the purpose. It would be of considerable help if the industry in concert with the research institutions provide the information and data needed to evolve policy measures to sustain and accelerate the growth. For instance, it would be helpful if the cost of preservation of food products in a cold chain is studied in order to determine the elasticity of storage cost with reference to customs and excise duties on cold storage equipment as well as on the power tariff. Such studies must take into account the peaks and troughs of the costs of procurement of food products, the storage costs and the market at the time of sale, taking into account the harvest cycle for different crops in different parts of the country. This is important because a certain study has estimated the capital cost for the construction for a cubic foot cold storage in India at over Rs 200 as compared to Rs 50 in the United States. It is unclear whether such a large difference in capital cost is due solely to customs and excise duties or is also because of economies of scale in US. Similarly, the rental charges for a cubic foot is estimated in India at Rs 10-12 as compared to Rs 2-3 in the United States. Here also, it is unclear whether the difference in such rental costs is primarily related to electricity charges and other operational costs. It would be helpful if these issues and such other issues could be examined in greater detail by some of the experts who have gathered here today in order to enable the evolution of a more practical policy.

The food processing sector has a continuing problem in the availability of the desired raw material of the appropriate grade in a uniform and predictable manner. A lot of work has to be done in this direction by government, research institutions and industry. We need to take steps necessary to enable the growers and producers of the raw material to meet the standards required by the food industry. While considering the scientific and technological interventions in the field of food processing I must express my deep appreciation for the sustained and diverse efforts made by all of you in the very many institutions of the country in this field. However, a consideration of the production base would leave no doubt as to the direction which we have to look for in the future. India has 169 million hectares of arable land compared to 188 million hectares in the rest of Asia, including China. Currently, we produce a little over 600 million tonnes of food, as much food as the US does. However, in every item of agricultural produce, the yields per acre are the lowest in the world. Compounding this weakness is the fact that several of the fruits and vegetables produced are unsuitable for processing as compared to the varieties available elsewhere in the world. In my view, a principal focus of activities would have to, therefore, be to develop appropriate genetic varieties not only to increase the yield but also to enable the growing of that food which can best be preserved to meet the needs of the growing population. In this regard, the steps taken by certain companies particularly in the matter of tomatoes,

sunflowers and gherkins are very encouraging.

While on the subject, it is important to note that the food industry in general and the growing of basic raw materials in particular can no longer be isolated from the practices in the rest of the world community. India has signed the Marrakesh treaty which led to the constitution of the World Trade Organisation. The compulsions of this treaty have also led to the adoption of the Codex Alimentarius standards and the related sanitary, phytosanitary and technical barriers to trade agreements. The world food industry is increasingly moving towards a system of total quality control which would encompass not only the grammar of production but also the syntax of farming. Pesticide residues in food and our responsibility to ensure responsible usage have been discussed often. A situation has now developed where exports of spices, coffee and other food products have been inhibited. There is a pressing need for concerted action.

The production base can be strengthened and enabled to move in the desired direction, only with sustained interaction and mutual support between the farmers, the industry and research institutions. There is a perception that such intervention in the entire food chain is possible only by large industrial and marketing concerns. The presence of Coca Cola, Pepsi, Cargill, ConAgra, ITC, Levers and other food giants in India, underscores the favourable and welcoming

environment; the shortsighted reaction to McDonalds notwithstanding. But there is not only room but a need for all players. The several initiatives taken by farmers, small industries and by NGOs augur well for the future.

The structure of the industry is small and large remains the same. Primary grain processing is the largest sector. Value addition is as low as 2% to 6%. The secondary and tertiary sectors are still small. Lately, there has been a marked increase in relative investment in the fruit/vegetable processing sectors and in consumer products. Interest in the processing and packaging of traditional foods has markedly increased, spurred by some spectacular successes. I am sure that Food Technology Research Institutions and the Industry are already sensitive to the challenges and opportunities which these developments offer. Related to this is the need to reduce the wastage inherent in the current practices of storage, transport and trading practiced in the country. There are several interventions, which even though simple, can affect the food industry profoundly if adopted widely. In this regard, I refer to oil extractors, a simple addition to the existing oil expelling industry, for increasing productivity. Similarly, the introduction of low-cost dryers to reduce the development of pathogenic organisms and toxic substances in food products. The most significant new development is

in the field of retailing. Though at present, it manifests only in a few urban centres I believe that this will be the accelerator of the industry. One has only to be conscious of the *Kirana* store to appreciate its significance. When in the fifteenth century, a few families from the village of Kirana were persuaded by Sher Shah Suri to open a few shops to make available provisions, a medieval revolution was launched.

These trends in production and retailing probably reflect urbanization and increase in the number of women in the urban workforce. The changes in the life styles and more importantly in expectations will deepen and widen to encompass all income categories. The challenge to Research and Industry is as to whether their vision and resolve is wide enough to comprehend the indian consumer and yet narrow enough to develop right foods in the right packs, at the right price, with the right taste and make these available at the right place.

I am confident that the research institutions in India and particularly CFTRI with the lead role it has, will certainly rise to the occasion and meet these challenges. In addition, I look forward to CFTRI as being an institution which would always keep one sharp eye open to the farthest reaches of the horizons. Several new technologies in the field of food processing are being

developed in various parts of the world, particularly in the developed countries. It is for CFTRI to assess these technologies and adapt and modify them to suit the Indian conditions. This will, of course, be a continuing and on-going effort. It should be remembered that research in food processing is not meant to be confined to laboratories only. If there is one field where the fruits of research must be translated into action on the ground, it is in food processing. The Indian research institutions have historically been slightly hesitant in being able to transfer research findings to practical implementation in the field. I trust that in this new century this deficiency will be adequately addressed. It is an institution like CFTRI which should widely distribute information and knowledge in order that more informed debate can take place in matters relating to food technologies. This is particularly important at a time when biotechnological research is taking place in several parts of the world and it would be very easy for uninformed opinion to influence policy.

You have heard my perception of where we stand; but mile stones only record the distance travelled. The journey ahead will be long but extremely rewarding. I am confident that the scientists of tomorrow, emerging from and working in CFTRI will help us travel that distance quickly."

ROLE OF BUTTERMILK IN THE MODERN DAIRY INDUSTRY

Sh. P.V. Suryaprakasa Rao
*Chairman, Panganamamula Foundation
 & Technical Adviser,
 Priya Foods, Hyderabad - 82. A.P.*

For ages India has recognized the value and role of buttermilk in nutrition, diet and health. There are other cultures elsewhere in the world, which have done likewise. Countries in Europe like Bulgaria can boast of centuries of yogurt culture and centenarians. Consumption of yogurt rich in *Lactobacillus* bacteria is believed to be an important contributing factor for the extraordinary increase in the life span of people in those countries. Individuals living beyond 120 and 130 years are not a rare phenomenon in some of them.

In recent years, Japan has discovered yet another group of bacteria, namely, *Bifidus*, endowed with virtues similar to those we are familiar with in the case of *Lactobacillus* bacteria. The Japanese have established a *Bifidus* Foundation to probe deep into the numerous merits of this bacterial group and to promote the widespread consumption of *Bifidus* - fermented milks and milk products. Countries like USA have made, lately, a massive switch over to yogurts, fermented milks and kindred products rich in *Lactobacillus*, *Acidophilus* and *Bifidus* bacteria. In fact, many of these products called Probiotics are offered commercially for public consumption, inoculated with live cultures. Modern research in the advanced countries into yogurt like

fermented milk products has uncovered several new values of potential benefit to the health and well-being of people, more particularly in the prevention and treatment of diarrhoea and other gastro-intestinal disorders, dental and gum diseases, cardiovascular disorders and heart diseases and in even mitigating the risks associated with certain types of cancer.

While such is the heart-warming situation elsewhere in the world, the state of affairs in our own country presents a sad spectacle. Cherished age-old values of buttermilk are nearly forgotten, especially among the younger generations. Buttermilk prepared consistently according to any kind of standards or norms is just not available anywhere in the country. Operation Flood has brought about a white revolution in the country. Liberalization policies have helped the country approach the front rank position in the world in milk production. It is a thousand pities that buttermilk, curds, yogurt and the like have suffered woeful neglect and have hardly found a place in the country's Dairy Industry of today.

While the rest of the world is only now awakening to the numerous values and virtues of buttermilk known to Indian culture for ages and are embarking on

massive movements for promotion of live culture yogurts, frozen yogurts (in preference to or in place of ice creams), fermented milks and milk products of all kinds, we in India are content to remain in oblivion. We seem to be oblivious not only of our own rich cultural heritage of our ageless past but also to the earthshaking developments taking place all over the contemporary world.

It is high time we mounted a nationwide operation flood campaign on buttermilk on the same scale of importance and magnitude as the now historic operation flood milk project. Buttermilk deserves to be the 'National Beverage Par Excellence', in keeping with our time-honoured, countrywide ancient tradition. We would not be emulating the Japanese example of *Bifidus* Foundation but be paying a fitting tribute to our own rich cultural heritage and rededicating ourselves to the foundations of public health and wellbeing truly laid by our ancestors centuries ago, by starting a full-fledged Buttermilk Foundation in the country at the National level.

Natural corollary to the above-suggested measures would be making good, wholesome buttermilk available and affordable to every one every where in the country at all times of the year, within the shortest

time span possible, as a matter of national priority. Such a proposition would be economically viable and practically feasible, as real good buttermilk could be produced at the rate of 3 volumes to 1 of milk and reasonably good butter milk at 5 times the volume of milk.

An outcry emanated sometimes from the Operation Flood Campaign that the villages were milked dry much to the impoverishment of their nutritional status. Selling only the mechanically churned out butter-fat-rich cream to the urbanites and retaining the skimmed milk in the rural areas for conversion and consumption in the form of wholesome protein-rich curds and butter milk, could retrieve and possibly also reverse the situation by restoring the nutritional status of the rural folk.

When cola type artificial beverages and so called 'mineral' (or mystic?) waters, which are least relevant to public health and well being - to say the least -- are selling dearer than pure wholesome whole milk, often at fancy prices, the provision of good, wholesome buttermilk at affordable prices to one and all would bring great relief to people. Nay, such a move would verily be a boon to the economically disadvantaged and the nutritionally deprived.

Demand Potential and cost Projections for Buttermilk in the Organized Sector

Potential demand for buttermilk exists largely in three market segments, viz., i) for use with meals, particularly those of rice eaters, ii) as a thirst quencher during warm weather and iii) as an all weather, health -promoting, wholesome food/beverage. As buttermilk has not yet found its proper place in the Organized Dairy Industry, it may be more sensible to consider, at this stage the overall demand rather than the segment-wise demand for the product.

This could be estimated in terms of possible consumption per caput per day. Assuming 100ml as the minimum per capita daily consumption level and nearly 1000 million as our country's population, the total potential demand would be of the order of 100 million ltrs per day. The other way would be to consider total volume of milk processed in the Organized Sector, which is currently estimated at nearly 10,000 million ltrs annually equivalent to around 30 million ltrs per day and derive the possible demand for the buttermilk thereby. Assuming that, to start with, 10% of the milk produced might be converted and sold as buttermilk, the potential demand for the latter

would work out to 3 million ltrs per day. This latter would be a most conservative estimate, being only 3 per cent of the estimated volume arrived at by the first method, but could be considered valid in the present circumstances/status of the Dairy Industry.

As regards the likely cost of production of buttermilk in the Organized Sector, we may proceed on the basis that it would be best to produce the same from toned milk. This is now sold at a maximum retail price of nearly Rs.13 per ltr. The optimum dilution for producing premium quality *Lassi* or buttermilk would be one part of milk plus two parts of water resulting in three times the volume of milk used. The cost of converting milk into buttermilk would be marginal, covering the cost of culture used and the additional equipment needed for the conversion. It may be assumed as Rs.1 to 2 per ltr of milk. Thus, three litres of *Lassi* or buttermilk of premium quality could be produced at a cost of Rs.5 per litre from one litre of toned milk costing Rs. 13 per ltr. Adding the extra cost of packaging and cold chain transportation, distribution and retailing, it might work out to Rs.7 to 8 per ltr. Adding the manufacturer's and retailer's margin, the product could be offered for sale at Rs.10/-per litre.

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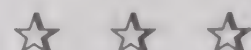
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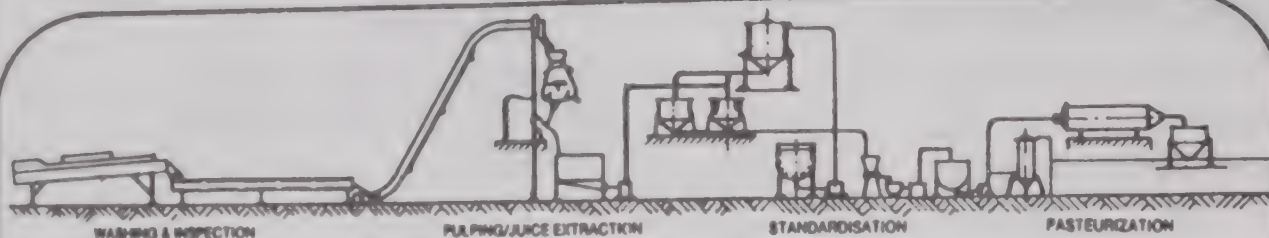
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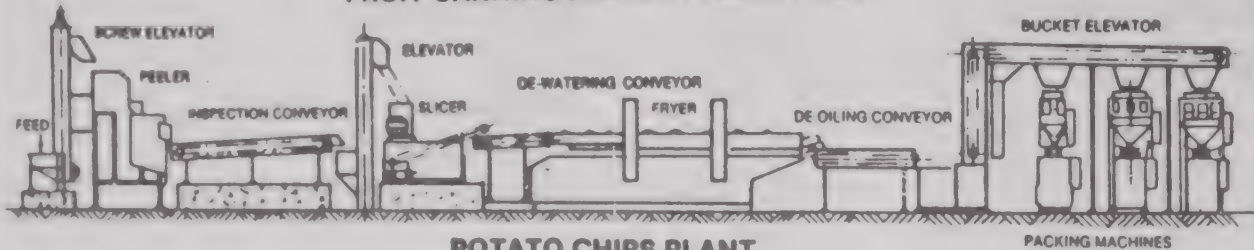
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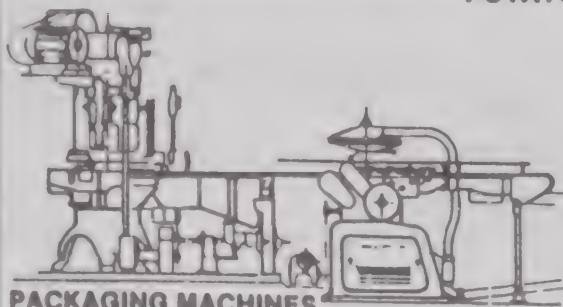
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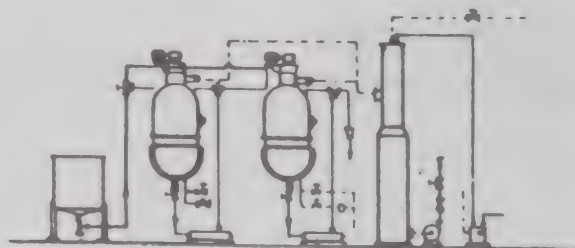
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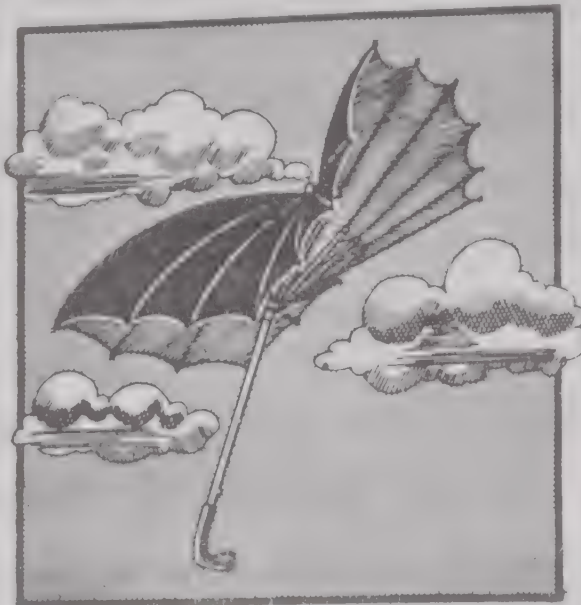
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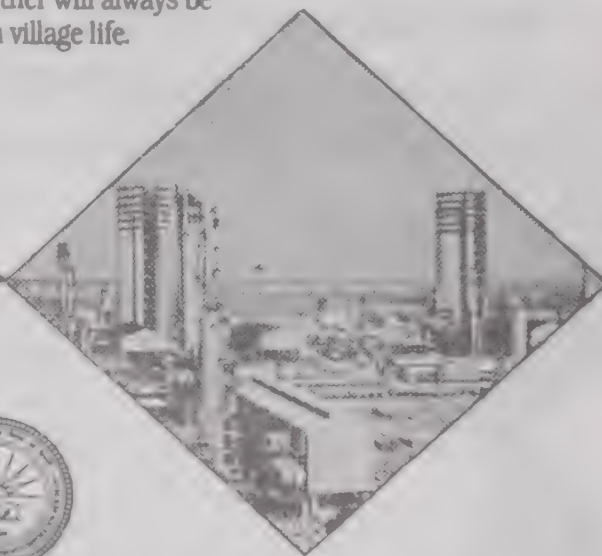
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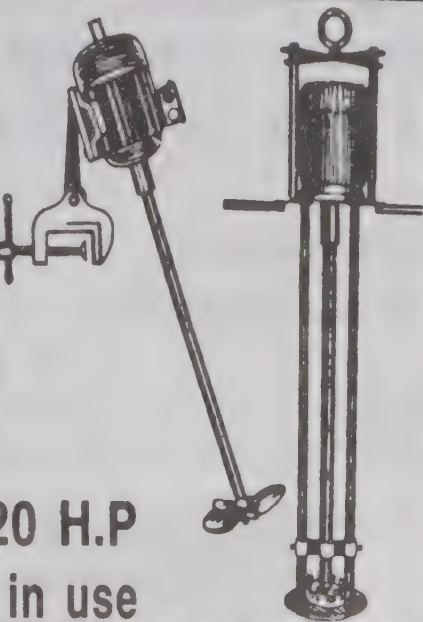
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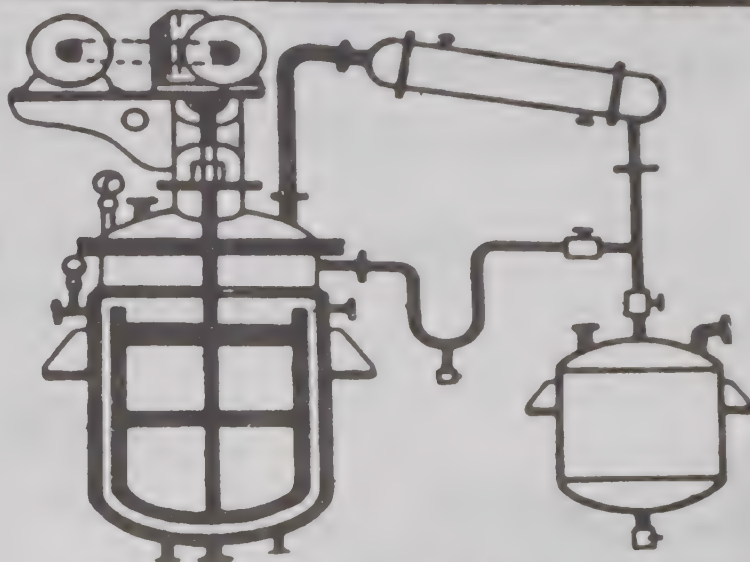
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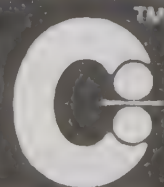


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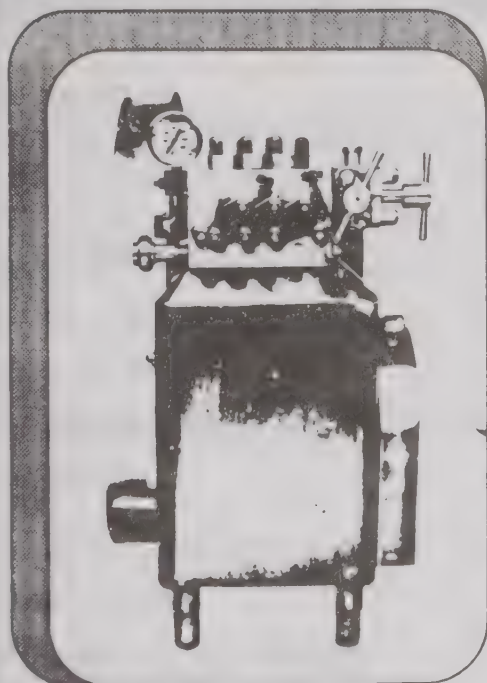
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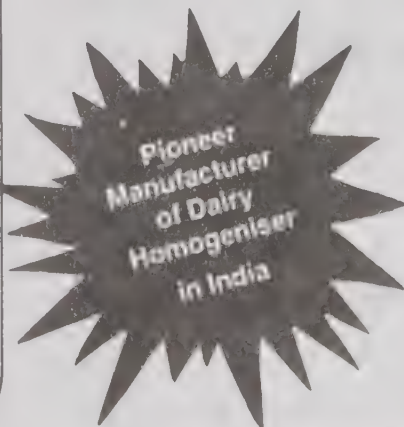


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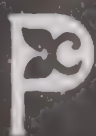
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"Various governments ruled over just many years have turned a blind eye towards us. Now, under the guise of compulsion as India is signatory to the WTO, the QRs are being phased out," said Raksh pal Abrol, President of Bombay Small Scale Industries Association.

Sri Mahila Udyog Lijjat Ltd, started in 1964, is a classic case of successful cottage industry venture. The papad maker has generated employment for over 40,000 women.

"Unfortunately, items produced in India's small scale/cottage industries attract heavy duties in Japan, Europe and Germany."

The Economic Times 01.04.2000



Liberal tax regime proposed for food processing sector

The Ministry of food processing has pitched in strongly for a liberal tax regime for food and confectionery companies in its draft policy resolution. The tax regime has been mooted to attract foreign direct investment (FDI) in the processed food industry.

In its draft resolution, which has been submitted to the Finance Ministry and which is expected to be opened for debate, the ministry has made a strong case for reducing the tax burden on food processing companies.

As per the draft resolution the

sum total incidence of taxes on a processed product was 42 per cent

The taxation package for the processed food industry includes Central excise tax, states sales tax, octroi, toll taxes and excise duty on packaging and adds up to an untenable tax proposition.

Highly placed government officials in the ministry told *The Observer of Business and Politics* that a high tax incidence had cooled off FDI in the food processing industry despite a liberal FDI policy in this segment.

The draft resolution recommends a rationalisation of the tax structure as also bringing down the total tax incidence to 20 per cent. Ministry officials said that wide ranging consultations with state governments was necessary since the measure had revenue implications.

According to senior ministry functionaries, the reduced incidence on taxation would enable processing companies to execute international environment standards. Internationally, this would facilitate exports, sources said.

The draft resolution also provides a framework for contract farming for the first time. The step has been taken to strengthen backward linkage with farmers. The draft resolution says that it is necessary to involve the panchayats and district administration in the process of contract farming.

Senior officials said that the food processing policy would cover issues relating to availability of raw

material, backward linkages, processing facilities, including post harvest infrastructure like cold chain system, food quality and safety, marketing of food products - domestic and exports.

Further, officials said, the policy would have liked to look into the question of reserved category for SSIs, but were constrained since the official brief was with the Ministry of Rural Development and Small Industry.

The ministry also proposed to undertake popularisation campaigns for spreading awareness about processed food since there was a conceptual gap for the Indian consumer.

The need to have a food processing policy arose due to the low FDI levels in the industry despite a liberal policy regime. NRI and OCB investments for technology requirement are placed under the automatic approval route of RBI

Even for the small scale units, equity participation up to 24 per cent of the total shareholding is allowed in the SSI by other industrial undertakings, including foreign collaborators.

The Observer

04.04.2000



Chordia Food to launch agrifoodindia portal

City-based Chordia Food Products has decided to launch agrifood india.com, a portal providing

services for the agrifood processing community - training, e-commerce, import and exports and content on the practical application of technology in this sector.

The company is in talks with various government, non government and commercial organisations for developing various utilities that will be available on the website.

The portal will have a special facility for ERP for food processors - a few modules of this package will be available in the first phase which will be launched very soon.

Chordia food Products managing director Pradeep Chordia said the listed company and other Chordia group companies will have a majority stake in the newly-floated Agrifood Informatics Ltd. This company will specialise in IT training and implementation of IT projects. Meanwhile, the Agricultural & Food Products Exports Development Authority (Apeda), Ministry of Commerce, Government of India, has decided to sponsor the Food India CD developed by Chordia Technologies that covers the food and the food processing industry.

The Food India CD will have information on laws, specifications, standards, list of associations, institutes and commercial information on food products. It also has provided technical information, newest concepts in food processing, future projections and opportunities apart from reference material. The CD will also include a product finder comprising exhaustive

information about processed food manufactures, packing material, machinery manufacturers and all allied industries associated with the processing sector.

Business Standard

04.05.2000



Processors fear acute mango shortfall

With the mango production in the South Expected to be just a third of last year's output, the processors are concerned about raw material availability and high prices during the current season.

Due to the uncertainty over raw material prices, the charges for mango processing are yet to be fixed, according to industry sources.

According to the President of the Chittoor District Fruit Processing Federation, Mr. K Balakrishna Reddy, the crop reports indicate a production of just 15-20 per cent compared to the previous season.

The reports had been poor to start with, and a recent spell of rains about 20 days ago had further aggravated the situation, he said.

Mr. Reddy said the prices were found to be prohibitively high, and this was especially a cause for concern since this would affect the margins.

Processors do not have a say in the pulp cost which is fixed by the traders and purchasers in the markets abroad, particularly West Asia.

The processors work on

conversion charges paid by merchant exporters. This involves a flat rate for processing with the mango packaging material, tin and chemical inputs provided by the exporters.

Last year, the conversion cost had been Rs. 2,100-2,200 per tonne pulp, and this year the processors are bargaining for about Rs. 2,500 per tonne, according to Mr. Reddy.

In the Chittoor mango processing belt there are about 30-35 units with a capacity to manufacture of 1,000-1,500 tonnes pulp per season. Primarily, thothapuri mango pulp is produced, and the mango cost could range from Rs. 5,000 and to Rs. 10,000 per tonne during the season.

Last year which was considered a bumper season, prices ruled around Rs. 2,500 per tonne, and pulp prices ranged around \$9-10 per carton (6 cans of 3.1 kg each).

The situation is similar in the Dharmapuri/Krishnagiri belts in Tamil Nadu, where there are about 20 units each with a 3,000 tonne capacity per season.

According to Mr. G. Venkatasamy, President, Dharmapuri Fruit and Vegetable Processors Federation, mango production is estimated to touch one lakh tonnes compared to three lakh tonnes last year in the surrounding areas. Thothapuri arrivals are expected to commence in June/July, but the prices are bound to be high.

In 1998, a bad season, fruit prices rose to Rs. 11,000 per tonne and the average was about Rs. 8,000.

While last year the average price was around Rs. 2,000-3,000.

This year, it could be worse than 1998. Correspondingly, in 1998 a carton of pulp was about \$14 while last year it was \$8, he said.

In these areas, the processors operate on the 'carton system'. The exporters provide just the cans and packaging while the processors have to procure the raw materials and process it at their own cost.

In 1998, the cost was about Rs. 400-400 per carton and this came down to Rs. 150 last year. With the uncertainty over raw material prices, the quotes are yet to be confirmed this year.

Meanwhile, in a bid to improve margins, the processors were gearing up for direct exports instead of going through a merchant exporter.

The cost of production of pulp had risen from Rs. 1,500 per tonne about a decade ago to about Rs. 2,200 per tonne. Mr. Venkatasamy said.

Business Line 03.04.2000



SIDBI funds for bio-tech, food processing

The Small Industries Development Bank of India (SIDBI) has said its two upcoming venture capital funds for biotechnology and food processing with a combined corpus of Rs. 200 crores would be structured as national funds.

"Encouraged by the response that we have received for our

national IT fund, SIDBI is planning to structure its two venture capital funds for bio-technology and food processing on the same lines," the chief executive officer of SIDBI Venture Capital Ltd. Mr. Rakesh Rewari, told PTI.

Mr. Rewari said a final decision on the structure of two venture capital funds would be taken shortly and added that the two funds were expected to be operational in the next five months.

Business Line

03.04.2000



The united colours of adulteration

Sweet lovers, beware! Sweets in attractive colours may contain ingredients which are injurious to health. In a recent drive launched by the Prevention of Food Adulteration (PFA) department, 14 samples which were collected from sweet shops in different parts of the city, have been found to be adulterated. PFA officials claim that adulteration is a result of imparting colours, which might be toxic, to sweets. Colours are added to sweets such as *laddoos*, *burfee*, *chumchum rasagolla* is to make them attractive.

According to the PFA director Ashok Bakshi, "These samples were found to contain colour additives far in excess of the permissible limit. As per the PFA Act, this is adulteration and the shop-owner is liable for prosecution."

As per the PFA Act, only one gram of natural colour can be mixed

with 10 kg of ingredients. Earlier the limit was two gram which was reduced to one gram.

"While only natural colours are allowed to be added in sweets in permissible quantity, it has been found that some sweets contain synthetic colour also which is more harmful," Says Bakshi.

According to divisional commissioner S.P. Aggrawal, "Since milk products are involved in sweet-making, the PFA department is constantly on alert. This is in order to ensure that the ingredients have not decayed. The area SDM, who also functions as the LHA (local health authority), is authorised to lift samples from sweet shops of his area. He has to be accompanied by two PFA inspectors. We have 27 SDMs and all of them are involved in this drive."

The procedure involves the samples being sent directly to the PFA for laboratory tests. Prosecution is initiated on the basis of the test report. If samples are found to be adulterated, action is required to be initiated against defaulters.

According to Bakshi, "The department has detected about 14 cases where the *mithai* shops have indulged in using excess colour to lure customers. It has come to our notice that even some reputed shopkeepers located in prominent localities have been found to be indulging in this unhealthy practice. We have collected samples from all over the city. After the mandatory tests in our laboratory 14 samples were found to be objectionable." So, the

next time you bite into that syrupy *cham-cham*, don't just think about the calories - think about colour too!

Times of India

05.04.2000



HP may ink pact for fruit-based industry

The Himachal Pradesh government is likely to sign an agreement for setting up of a fruit-based industry in the state, chief minister Prem Kumar Dhumal said on Wednesday. While addressing a meeting at Kotkhai in Shimla district, Dhumal said government was committed to improve the condition of the farmers and fruit growers in the state and the proposed fruit based plant would help the fruit growers in Shimla and Kullu districts to get remunerative prices for their produce. State government had withdrawn the taxes imposed on fertilizer insecticides and pesticides to help the fruit growers, he added.

The Observer

06.04.2000



Efforts on to protect patent rights over indigenous agro products

The government is engaging the services of agriculture scientists in the country to find out ways and means of challenging the patent rights being filed in respect of certain agro produces like karela (bitter melon), jamun and brinjal in foreign countries, said the minister for rural development and agriculture. Sundarlal Patwa.

Patwa who was inaugurating the editors conference on social sector issues in the Capital on Thursday said that farmers right over indigenous agro produces and seeds should be safeguarded and appropriate strategies should be worked out for boosting agricultural exports in future. He said that in the proposed Plant Variety Protection and Farmers Rights Bill which was placed in Parliament on December 19, 1999 and referred to a parliamentary committee headed by Sahib Singh Verma has incorporated sufficient provision to protect the interests of farmers.

He said that with a view to boost the production of horticulture crops a separate technology mission on these crops will soon be launched exclusively for the north eastern states. Crops like banana, pineapple, citrus, nuts, passion fruits, vegetables, mushrooms, chillies, ginger, cardamom, flowers, ornamental plants and medicinal plants will be covered under this technology mission. A special programme has been formulated for on-farm water management for increasing crop production in eastern India.

Patwa said that in order to save soil degradation owing to excessive use of chemical fertilisers and to check health hazards due to high doses of chemical pesticides, the government has decided to constitute a task force for suggesting appropriate measures. He said that the new National Agriculture Insurance Scheme has been

successfully launched in the on-going rabi season and about 2.34 lakh farmers have so far been covered.

Increased efficiency in agricultural production is critical to poverty reduction. In this connection the new department of land resources assumes importance. This department will deal with the department of wastelands for developing lands for agricultural use.

The Financial Express 07.04.2000



PFA Dept indicted for Poor Planning

A staggering 86 per cent of the samples declared adulterated, after tests in the laboratory of the Prevention of Food Adulteration department were later declared unadulterated by CFL, Calcutta.

The Comptroller and Auditor General report released today found the testing by the PFA department inadequate and noted that in many cases where prosecution was launched, were discharged as the samples were later proved unadulterated.

Between 1998 and 1999 of 557 cases where the department initiated prosecution, after samples were declared adulterated 125 were discharged by the courts based on CFL reports.

The CAG report said the department failed to substantiate a large number of adulteration cases filed in the courts. In 14 per cent cases, the samples were decomposed

and not fit for test by CFL. With regard to dropsy cases too, the report stated that till July 1999, all the 18 accused were discharged by the courts when the department failed to substantiate the adulteration.

Indicting the department for "poor planning" which resulted in "no conscious or systematic sampling of identified areas", the report stated that actual average coverage of all food establishments during the last five years was only 0.6 per cent. Thus 99.4 per cent of food establishments remained without surveillance, exposing residents to risk of adulteration".

It said food inspectors were not assigned areas as prescribed and thus accountability could be fixed. Between 1994 and 1999, against the norm of 12 samples each month to be lifted by each field inspector, only 1.07 samples were collected.

The Statesman 07.04.2000



Plastic wrap to detect spoiled food

A Canadian company is developing a plastic food wrap that will change colour if food is contaminated with dangerous bacteria. New Scientist magazine has said.

The Toronto-based Toxin Alert's wrap will contain antibodies that stick to the inside of the wrap and are activated when it touches spoiled food.

"The wrap will be made to detect salmonella, campylobacter,

escherichia coli 0157 and listeria bacteria," the weekly science magazine said, referring to common causes of food poisoning.

The company said the product would cost about 25 per cent more than ordinary wrap. It may also be adapted to detect pesticides or even proteins characteristic of genetically modified (GM) foods. "This should be affordable for everyone. If you can afford a sandwich bag, you should be able to afford one of our sandwich bags," Mr. Gord Furzer, the vice president of the company, told the magazine.

The wrapping is composed of separate layers to capture and detect the bacteria. The inside surface has the antibodies. A top layer contains a nutrient gel that holds another set of antibodies attached to a coloured chemical process. "Finally there is a porous layer that makes contact with the food and allows disease-causing organisms to pass through the nutrient gel," is said.

Once the organisms are captured and coloured they diffuse towards the antibodies stuck in the inner layer in the form of an X, making it visible.

Mr. Furzer admitted the wrap was not sensitive enough to detect small amounts of bacteria which could still make people sick. "What we're looking at is stopping gross contamination that causes mass illness and death."

The Business Line 07.04.2000



Biscuit cos irked over excise hike, demand zero duty

Leading biscuit companies including Britannia, Parle and Bakeman's have called for total scrapping of excise duty on the product. The move by the government to double the excise duty to 16 per cent has come as a big shock to them.

The industry leaders under the Federation of Biscuit Manufacturers' Association of India (FBMI) on Saturday met the finance secretary Piyush Mankad and said that the government revenues would in no way be affected as the net Rs. 100 crore mopped up through excise has to be imputed back to the industry through the MODVAT.

The high excise is poised to undermine the Industry which is already faced with competition from multinationals after the OR removals under the WTO.

The biscuit manufacturers also met the Finance Minister Yashwant Sinha on Friday and sought total removal of excise duty, which was reflecting growth of the Rs. 1,700 crore organised biscuit industry.

"The government should treat biscuits at par with packaged tea, coffee, namkeens. Such a move would lead to a drop in biscuit prices and a 20-25 per cent demand growth," said Nikhil Sen, President of the FBMI.

Even as the finance minister has not committed anything, the manufacturers have said that the

excise duties are removed, they would drop prices of our products with immediate effect. If excise duty is retained at 16 per cent, we will see around 50-60 per cent of the small manufacturers closing down leading to large scale lay-offs.

"Almost two months have passed since the budget was announced and we are bleeding. If this goes on for another month or two we will be seeing closure of several units in the sector," said Sen.

The steep hike in excise duty will negatively impact the industry as the manufacturers would be forced to hike prices, which would result in a drop in demand.

The Federation has also held meetings with the chairman and other senior officials of the Central Board of Excise and Customs (CBEC).

"Last year, when the duty on tea, a mass consumption item was raised from zero per cent to eight per cent, the demand fell. The duty was subsequently reversed. Biscuits, like tea are mass consumption items and should be treated at par," said Sen.

Adding to the woes of the biscuit industry various states have increased sales tax on biscuits ranging from 16 per cent in Andhra Pradesh and eight per cent in Uttar Pradesh, Karnataka, Delhi and Haryana. The recent five per cent hike in Railway freight has pushed up cost of raw materials and inputs such as sugar, edible oil and packing material.

The federation has stressed that

the doubling of excise duty would result in a drop of demand for biscuits.

He also added that the growth rate of the biscuit industry in India is negligible and the per capital consumption of biscuits in our country is mere 1.52 kg as compared to more than 12 kg in developed countries.

The Financial Express 09.04.2000



Fruit importers in a jam over duty hike

A series of increases in duties on the import of fresh fruits and juices has soured the trade for importers.

In the last two years, there had been a flood of imports and the trade hoped to stabilise and expand the market base this year. But the hikes in excise duty, import duty and related levies and sales tax had squeezed the margins and put a crimp in the plans.

As it is, these products were targeted at the upper middle income group because of the high import duties existing earlier. Traders had been expanding the market base among the middle income group too by highlighting the quality and international brand.

With the duty increases pushing up prices further this year, these products would now be out of reach for a large section of the middle income group, feels the trade.

According to Mr. A.V. Bhaskar of Adluri Foods, which imports the

Berri brand of fruit juices from Australia, the increase in import duties from 51 per cent to about 67 per cent had put a crimp in its market plans.

Added to its woe was the Tamil Nadu Government's decision to hike sales tax to 20 per cent.

Following the increase in taxes the company hiked the price per litre of fruit juice to Rs. 95 and reduced the freebies compared to the introductory offer of Rs. 75 with freebies.

The company was earlier offering an attractive gulper bottle of juice free with a one-litre pack.

According to Mr. Bhaskar, Adluri Foods had been hoping to operate on large volumes to compensate for the 'wafer thin' margins involved. Now, the margins had been reduced by another two to three per cent with not much hopes of market expansion. The hike had put the product firmly in the upper middle income bracket, he said.

For the domestic fruit-based beverage manufacturers, the hike in excise duty had dampened spirits just ahead of the peak season sales this summer. For instance, Frooti's price had increased by Rs. 1 per 200-ml pack. The manufacturers were the worst affected, because the margins were concentrated only at the retail level, according to company sources.

The excise duty hike to 16 per cent from eight per cent, plus the change in the norm of calculation and the sales tax works out to Rs. 2.20 per pack. The excise duty is

calculated on 60 per cent of minimum retail price compared to the ad valorem rate, earlier.

The hike in levies had affected the fresh fruit importers too. With the first consignment expected in a few days the importers wanted to assess the impact of the price increase before confirming further orders, the sources said.

In the last two years there had been a heavy import of fresh fruits such as apples, citrus varieties and grapes from Australia, New Zealand and more recently from South Africa. The advantage was that Australian apples could be imported when the domestic varieties were not in season or as at present when the output was low.

According to Mr. M.S. Rahim, an importer in Chennai, the trade had been planning to import about 100 containers this season. But the orders had been frozen at about 32 containers, and these were to be confirmed only after the first consignment arrived in mid-April and the demand assessed.

With the import duties going up to 62 per cent for apple and 35 per cent for grapes, prices would have to be hiked accordingly and the consumers were not going to be happy, he said.

The Business Line 10.04.2000



Farm Exports Ignored

The new Exim Policy has the laudable objective of raising exports significantly. For 2000-01, the

Government has targeted an export growth of 20 per cent. The highlights of the new Exim Policy include such esoteric measures as setting up of special economic zones, initiatives on e-commerce and of course, the more mundane 'removal of quantitative restrictions' on imports. But one segment that is conspicuous by its absence in the new policy is agro-exports. There is nothing in the policy to suggest that the Government considers agricultural and allied products as areas deserving of an export thrust. Has promotion of agro-exports become less important or less fashionable?

The policy on export of several farm commodities continues to be restrictive and these products have remained shackled for many years now. Quantitative restrictions on imports are being phased out, under compulsion and in terms of the commitments to the World Trade Organisation. However, those on exports continue to operate without any apparent justification. Some time ago, the Government had stated that export of commodities shall not be restricted if their imports are also permitted; but the statement seems to have been forgotten. The Government is forced to allow imports that compete with domestic goods. Ironically, even in the case of major commodities, such as wheat and sugar, in which the country has more stocks than it can efficiently handle, export restrictions continue. Lesser items, such as onions, nigerseed and gum karaya, continue to be canalised through government-

supported cooperatives, the rationale for which is unclear. There is no evaluation of who the beneficiaries of such restrictive trade policies are. In April-December 1999 (the latest period for which official export data are available), export of agricultural and allied products as a group declined 10 per cent over the corresponding previous period. The situation is unlikely to have improved in the subsequent quarter of the last fiscal and the prospects for a recovery in the export of this group in 2000-01 do not appear encouraging.

The new Exim Policy is incomplete to the extent that it has not initiated measures to promote farm exports. More often than not, the international preference for Indian products is hampered by high cost, poor quality and tardy shipment. The new Exim Policy should have addressed these issues. Specific measures with a long-term perspective are necessary to promote agri-exports in the global market place. For instance, setting up of exclusive export-oriented production facilities should be encouraged. For this, the cooperation of State governments is imperative. The policy-makers have no doubt envisaged a role, albeit minor, for states in the promotional efforts. To start with Rs. 250 crores has been earmarked for utilisation by the States to develop complementary export infrastructure such as roads to connect production centres with ports; research and development of State-specific products, setting up cold chains for agro-exports and so

on. But no provision encourages production per se. Given the poor conditions under which producers are forced to market their goods, there is no incentive to produce quality products.

Another area that deserves more focussed attention is the role of commodity boards, export promotion councils and sundry authorities. With global agri-business becoming increasingly competitive, exporters need timely flow of market information and the promotional agencies must be alive to such dynamics. The Commerce Minister must devise a gameplan for boosting agricultural exports.

The Business Line 10.04.2000



'Risk of food adulteration high'

The capital faces a serious risk of adulterated food being supplied to the consumers due to woefully inadequate surveillance infrastructure and lack of a licensing authority.

"Delhi is the only state in the country where a licensing authority, responsible for the issuance of licences to food establishments after ensuring their quality, has not been established," points out the report of the Comptroller and Auditor General (CAG) of India.

It brings out some basic issues which have been overlooked by the city government. The prevention of Food Adulteration (PFA) department does not have information about the exact number of food establishments

in the capital. "The figure, derived on the basis of sales tax registration or from other departments of 1.5 lakh establishments is only an estimate," it says.

The report for the year ended March 1999, presented in the Delhi Assembly of April 6, says the infrastructure in the PFA department is too little to cover the estimated establishments nor has the department of infrastructure to ensure proper surveillance.

"Against the target of 12 food samples to be lifted per inspector, each of the 37 inspectors lifted on an average just about two samples per month. This reflects an insensitive attitude of the department to the risk the report points out and adds "whatever little sample check is undertaken, these are on a random, rather than on a systematic and planned pattern." (UNI).

The Business Standard 11.04.2000



Indage to set up fruit-based wine Co in Himachal

The Shyam Chougule-promoted Indage group, which was the first company to produce sparkling wine or champagne in India, will be entering into a memorandum of understanding (MoU) with the Himachal Pradesh government on April 11 to set up a new company.

The company will be manufacturing fruit-based wines in Himachal Pradesh and the MoU will be signed in the state assembly,

Chougule, chairman of Chateau Indage, said in London yesterday.

The Himachal Pradesh government will be picking up 20 per cent of the equity in the new company, while another 20 per cent will be held by the fruit growers of the state. The remaining 60 per cent of the equity will be held by the Indage group and a foreign partner to be selected by Indage.

The group has already identified KEO of Cyprus, a 130-year-old wine and beer company, to partner it in the project. The new company which will be called Himachal Indage, will be sourcing technical assistance from the 130 year old German institute Geisenheim, Chougule said.

The project cost for setting up the largest fruit-based wine project in the country will be around Rs.26 crore, Chougule added.

Indage has also received the government's permission to import and sell wines from abroad, making it among the first entities to do so. The company received the permission after it fulfilled its export obligations in 1995.

After bagging the Indian government permission, Indage has entered into three joint ventures with wine manufacturers in Germany, France and the US, whereby Indage will be importing and selling their wines in India while they would reciprocate by bottling and selling Indage wines in their respective countries.

Accordingly Indage has entered into joint venture agreements with

ente of California, US, Taylla of
ance and Peter Mertes of Germany,
nougule said.

The Business Standard 11.04.2000



Court Order

SC : Fruit juice cannot be taxed as Fruit

The Supreme Court held
esterday that ready to serve
verages using raw materials from
ango, apple and other fruits were
fferent from the fruits themselves
r the purpose of taxation of
gricultural products.

The court declared this in an
ppeal by Edward Keventers Ltd.,
hich produces fruit drinks like
ooti (mango) and Appy (apple).

The Bihar government
uthorities interpreted the definition
"agricultural produce" in the state
gislation to cover the packed
ncentrate drinks as the fruits
hemselves and demanded tax. The
mpany moved the Patna High
ourt without success.

On appeal, the Supreme Court
nch consisting of Justice V.N.
nare and Justic Doraiswami Raju
aside the high court judgment
d ruled that the government had
authority to tax the ready to serve
ackages.

The judgment said: "The basic
redients may be the same but the
id product which is known
fferently is treated as a separate
em."

The Business Standard 14.04.2000



Delay in setting up fund for agri industry flayed

A Parliamentary Committee has
flayed the "under delay" in finalising
the proposed Food Development
Fund (FDF), which has been
hanging for over a year and asked
the government to make the fund
operation during the current
financial year.

FDF, which was to be set up
during the first quarter of 1999-00,
would facilitate cheaper and easier
access to funds for the fledgling food
processing sector.

"The committee is dismayed to
observe that its recommendation for
setting up the FDF within the first
quarter of 1999 has not been
implemented," the latest action taken
report (ATR) of the Department of
Food Processing (DFP), Ministry of
Agriculture, Said.

"We feel that undue delay has
occurred in finalising a fund for
which a token provision of Rs.1
crore had been earmarked for 1999-
00. Because of this delay in
formulating a policy, no money
could be utilised or borrowed in
1999-00," the report added.

In its reply to the committee,
the government said that a
comprehensive strategy for creating
the FDF has been evolved and it
would be created in association with
lending institutions like Small
Industries Development Bank of
India (Sidbi) and Industrial
Development Bank of India (Idbi).

In the proposed scheme, the
ministry of food processing

industries (MFPI) would contribute
20 per cent of the total fund corpus,
while the remaining 80 per cent
would come from the two lending
institutions.

"From the fund so created, the
processed food sector may be able
to get finances at an interest rate
lower than the commercial interest
rate," the government said in the
ATR, reaffirming that a token
provision of Rs. 1 crore has been
made for the fund.

Setting up the FDF and other
initiatives are part of the
government's effort to boost growth
in this sunrise industry, which
compares unfavourably with that in
other developed as well as developing
countries.

India processed only a minuscule 1.8
to 2 per cent of the food produced,
whereas Thailand processes 30 per
cent, Brazil 80 per cent while the US
and UK process as high as 60 to 70
per cent of food produced,
exhausting a sizeable amount of their
central outlays.

The Business Standard 15.04.2000



House panel blasts food development fund delay

A parliamentary committee has
flayed the "undue delay" in finalising
the proposed Food Development
Fund (FDF), which has been
hanging fire for over a year and
asked the government to make the
fund operational during the current
financial year. FDF was to be set up
during the first quarter of 1999-

2000 to facilitate cheaper and easier access to funds for the fledgling food processing sector.

"The committee is dismayed to observe that its recommendation for setting up the FDF within the first quarter of 1999 has not been implemented," the latest action taken report (ATR) of the department of food processing (DFP), ministry of agriculture said.

"We feel that undue delay has occurred in finalising a fund for which a token provision of Rs.1 crore had been earmarked for 1999-2000. Because of this delay in formulating a policy, no money could be utilised or borrowed in 1999-2000," the report added.

In its reply to the committee, government said that a comprehensive strategy for creating the FDF has been evolved and it would be created in association with lending institutions Sidbi and Idbi. In the proposed scheme, the ministry of food processing industries (MFPI) would contribute 20 per cent of the total fund corpus, while the remaining 80 per cent would come from the two lending institutions.

"From the fund so created, the processed food sector may be able to get finances at an interest rate lower than the commercial interest rate," government said in the ATR, reaffirming that a token provision of one crore rupees has been made for the fund.

Setting up FDF and other initiatives are part of the government's effort to boost growth

in this sunrise industry. India processes only a minuscule 1.8.2 per cent of the food produced, whereas Thailand processes 30 per cent, Brazil 80 per cent while the US and the UK process as high as 60-70 per cent - PTI.

The Economic Times 15.04.2000



Auction old Grains Stock: Committee

A parliamentary committee has expressed concern over the mounting foodgrain stock in the state account and has recommended sale of grains older than two years with the Food Corporation of India (FCI) through auctions.

"There should be a clear policy regarding the disposal of stocks which are older than two years. They should preferably be disposed of through auction," the standing committee on food, civil supplies and public distribution said. The committee in its second report has asked the government to make every effort to clear the old stock and strict compliance of the principle of first-in-first out policy by FCI to ensure that the grains were not spoilt.

A total of 11.60 lakh tonnes of food grains and about one lakh tonnes of sugar are estimated to be in FCI godowns that are more than two years old.

"The foodgrains thus become unfit for human consumption, besides creating scarcity in storage capacity for fresh crops," the committee said.

Government in its reply has expressed the inability in disposing of the old stocks as it was bound by tedious pricing mechanism that governs sale of grains from the state account.

"It is a matter of great concern that the foodgrains which the farmers produce with their sweat is left to spoil and no accountability is fixed in this regard," it noted.

The Economic Times 15.04.2000



QR removal high excise duty weigh down branded food cos

Branded processed food companies are in a tight spot faced with high incidence of excise imposed recently by the government as well as the mounting competition with the QR removals under the WTO.

"The government provides a total subsidy of Rs. 12,000 crore to the agriculture sector but the wastage levels in the sector is valued as high as Rs. 37,000 which in net affect means that the entire subsidy goes to waste," says a highly placed source in Confederation of Indian Food Trade and Industry (CIFTI).

The single major factor for the high price of indigenous branded foods is the incidence of high excise on branded products, on packaging and on infrasture with an equally high cascading effect upon the final prices.

Experts in the industry point out that as the removal of the QRs

are underway more foreign food items would be imported as they become equally or in certain cases even below the prices of the domestically produced brands.

"We are heavily under pressure with imported products being almost at par with our domestically produced ones," said highly placed source in Supersnax, the makers of Tiger brand biscuits.

As per the industry, the high excise of 16 per cent imposed as CENVAT by the government combined with sales tax, octroi, trade margins and the high cost of packaging makes up as much as a whopping 30-50 per cent of the selling price.

"In the international market this differential is quite low and hence the demand for the processed and packaged foods is quite high," said KP Mohandas, Secretary, All India Bread Manufacturers Association. Also the convenience factor makes processed foods highly preferred against the traditional items abroad.

At a benchmark comparison, industry sources point out that incidence of taxes in India is as high as 16-40 per cent in terms of excise on processed food equipments while it is nil in major countries like US, Malaysia and Thailand. In terms of sales tax it is 5-12 per cent while this is nil in US. Excise on imported capital goods also ranges between 16-40 per cent while it is nil in most of the countries including the US.

The discrimination between the branded processed foods has led to

a recession in the segment which in turn not only siphons off government revenues but also encourages production of spurious and packaged food products.

It is pointed out that the even for the products in which excise duty is being doubled this year, the revenue rise is expected to be only, around 12 to 13 per cent. At the same time, however, the demand will suffer with the end result there would be a net fall in revenues. "Then what is the rationale for this duty hike? questions CIFTI.

In the firing range is the native consumer who will be the final loser." We still have time to correct this anomaly and make way for the good consumerism," say sources.

Despite India being the second largest grower of fruits and vegetables in the world, the largest producer in milk, cereals and livestock the fact remains that processing makes up only a dismally small amount. In the case of horticulture, for instance, sources point out almost 1.5 per cent is processed while the rest 30 per cent is wasted.

This can be compared to that in China where the value addition is 23 per cent, 45 per cent in Philippines and 188 per cent in UK.

The Financial Express 17.04.2000



Govt to build 18 more Cold Storage Units

The state government has decided to take up construction of

18 new cold storages in the state to enable the farmers to store perishable goods like vegetables and fruits, according to marketing minister B Veera Reddy.

Addressing press conference here on Sunday, the marketing minister said that the government was prepared to hand over the works related to the storage of goods to the private parties interested in the task. All the 18 cold storages would be organised privately, he said.

The minister stated that the government had given its consent for construction of two cold storages each in Mahabubnagar and Warangal districts, five in Guntur district, three each in Visakhapatnam, and Ranga Reddy districts and one each at Srikakulam, Ongole and Rajahmundry.

The minister said that the proposal of setting up a cold storage unit at Hindupur in Anantapur district was under serious consideration of the state government.

The cold storage unit would be utilised for preservation of tamarind. The Rythu bandhu' scheme introduced by the marketing department proved to be a success, the minister said. Under the scheme, farmers would get financial help at the time of harvest.

District marketing director G Rajasekhara explained to the minister the progress achieved under 17 marketing yards in Chittoor district.

The Newstime 18.04.2000
☆☆☆

Setting up of fruit-based units hailed

Mr. Karan Singh, Himachal Minister of State for Primary Education, has hailed the decision of the state government for setting up a fruit-based wine units at cost of Rs. 25 crore in Shimla and Kulu districts.

In a statement here yesterday, he said setting up of the fruit-based unit in the state would go a long way in revolutionising the economy of the fruit growers and with the setting up of this industry value-added products would fetch better returns to the growers. He said the government was also considering setting up of more unit based industries in the state.

He also welcomed the decision of the government to increase import duty on apple and said the imposition of 50 per cent custom duty would discourage import of apple into the country and protect the interests of small and marginal apple growers of the state.

He complimented Mr. Prem Kumar Dhumal, Chief Minister for strengthening the economy of fruit growers of the state

The Financial Express 20.04.2000



'Food Processing being Ignored'

A Parliamentary panel has flayed the government for not setting up a special committee to suggest policy changes in processed food sector, which has an abysmal growth rate and the under-utilisation of Plan

funds.

"We are constrained to observe that the government has not given any definite reply to our recommendation regarding setting up of a special committee to undertake a comprehensive study of policy framework and related aspects of food processing vis-a-vis other countries," the standing committee on agriculture said in its action taken report (ATR) tabled in Parliament recently.

"The special committee should be set up immediately," the report said stating that India was at the lowest rung of the food processing sector globally.

India processes only about 2 per cent of the food produced as against a whopping 80 per cent by Brazil, up to 70 per cent by Britain and the US and 30 per cent by Thailand.

Also, the Parliamentary panel found the ministry was unable to utilise allocated funds. "In the past three years, the capacity of the ministry to utilise funds has come down drastically."

Against Rs. 44.10 crore allocated for Plan schemes the ministry could utilise only Rs. 30.80 crore in 1998-99, the ATR said.

"We have observed that there is definitely some inherent defect either in the policy or in funding," the apex panel said adding that the proposed special committee would undertake a comparative study of the policy framework, legislation and the funding policies adopted in other countries.

The committee also directed the government to apprise it of the recommendations of National Council for Applied Economic Research (NCAER).

"The committee should also be apprised of the recommendations of the NCAER which was assigned the task of comparative study of the policy framework and evaluation of the projects assisted by the ministry during the Eighth Five Year Plan and first year of the Ninth Five Year Plan," the ATR said.

The Business Standard 20.04.2000



Panel moots fiscal benefits for Food Processing Units

To Leverage India's competitive advantage in exporting food item, the task force on processed foods, constituted by the government, has recommended a special financial package and fiscal incentives for that sector, along with industry status and other incentives for the packaging industry.

The special financial package for the sector was to cater its "peculiar" requirements, it said.

"There is a need for the agricultural financial institutions to reorient the financial and risk analysis of agro enterprises, in view of the seasonal nature of the raw materials. There is a need for networking of plan schemes operated by various government departments," the draft report of the task force, chaired by retired secretary to the

vernment P.Murari reveled.

It goes on to say that the recommendations of the Nusli Wadia Committee, which had recommended setting up of a food development bank, should be implemented immediately.

The tax level on processed foods, says the task force, should be rationalized and processing, which at present comprises 14% of the total industry output, should be treated as extension of agriculture.

Excise duty on packaging material and local freeze cabinets needs to be reduced, it says, adding that no distinction should be made between the branded and non-branded sectors for the purpose of excise duties.

Sales tax and other state levies also need to be rationalized, it says. Concessions in excise and customs duties as well as income tax have also been suggested to promote use of indigenous plant and machinery.

The formalities and clearances required for setting up of new processing units need to be reduced and streamlined into a single-window clearance, the task force's draft report said.

Electric supply to processing units has to be assured at concessional rates as given to the farm sector, says the task force.

The Hindustan Times 15.04.2000



Kerala Horticulture dept launches Jive Juice

Jive, the 250 ml pineapple juice produce by the Nadukkara Agro Processing Company Ltd. (NAPC) and promoted by the Kerala Horticulture Development Programme (KHDP), has been launched in the domestic market.

The new product was launched by KHDP, a project co-funded by the European Union as the part of the Government's efforts to increase awareness for consumption of natural products. It has established a factory, which could process about 3.5 tonnes of pineapple per hour to make the juice.

The factory at Nadukkara links farmers and consumers in a two-way process, in which the farmers get the maximum price and the consumers would be provided with fresh and best products at reasonable rates. It is integrated with target farmers, who supply fruits to the factory. It has been established as a public limited company with target farmers to become 70 per cent share holders and the State Government with 30 per cent, a press release said.

The Business Line 21.04.2000



UK sets up Food Standards Body

The Ministry of Agriculture, Food and Fisheries in the UK helped establish a new food standards agency (FSA) early this month. For the first time, all the aspects relating to food safety and standards from

farm to fork - are the responsibility of a single organisation.

The mandate of FSA is to protect the interests of consumers by following three core values. FSA will put the consumers first; be open and accessible and be an independent voice.

The agency's functions are to provide advice to the public and to the Government on food safety, nutrition and diet; protect consumers through effective enforcement and monitoring and support consumer choice through accurate and meaningful labelling.

Serving the interests of consumers in relation to food safety is the legal remit of the FSA as defined in an Act of Parliament. The Act also ensures the independence of the Agency by entitling it to publish its advice to the Government.

The agency will regularly consult with consumers to understand their views and concerns so that it can meet their needs.

According to a communique from the FSA headquarters in London, there are three main groups within the FSA. Food Safety Policy Group deals with all aspects of food safety and nutrition. Enforcement and Food Standards Group will help local authorities improve the effectiveness of local enforcement of food standards legislation. The third is Corporate Resources and Strategy Group.

The agency will be managed by a 13-member Board that includes two Asians- Dr. Bhupinder Singh

and Mr. Gurbux Singh. The Board is responsible for overall strategic direction of FSA.

The Business Line 24.04.2000



Restore Ministry Status to Food Processing: Panel

A Parliamentary Committee has asked the government to restore ministry status to the Department of Food Processing Industries (DFPI) and mooted a single food controlling authority.

The standing committee on agriculture said the decision to turn the erstwhile ministry of food processing industries (MFPI) into a department under the ministry of agriculture was taken "in October 1999 through a high-level decision, the reasons for which are not known to the department".

On the basis of this, the committee, in its report tabled in Parliament recently, asked the government to turn the department back into a full-fledged ministry.

"We recommend that the government should reconsider its decision and accord ministry status to the department and also advise the department to present their case so that it regains the lost status in the larger interest of the food processing industry," the committee said.

The committee co-differentiated between the functions of ministry of agriculture and the DFPI, saying the former's primary function was to provide sufficient food and food

surpluses to the nation, while the latter would take care of the post-harvest marketing, distribution and storage factors, which are crucial to India in achieving global standards.

"At present, India has a very weak post-harvest storage, marketing infrastructure and value-addition capabilities, which causes tremendous loss to the nation," the committee noted in its ninth report submitted in Parliament recently.

"A strong and effective food processing sector plays a significant role in the diversification and commercialisation of agriculture, improvement in value-addition of the agricultural produce, generation of employment in rural areas, enhancing the income of farmers and creation of surplus for export agro foods, the standing committee said in its report.

To pursue these objectives, it said a lot of work needs to be done, for which ministry status must be restored to the Department of Food Processing.

The committee also noted that the ministry of food processing industries was striving to come out with better results in the last two years of the Ninth Plan before it was made into a department in October last year.

The standing committee on agriculture emphasised the dominant role food processing played in the diversification and commercialisation of agriculture.

The committee said, "The value addition of raw agri-products and

development of post-harvest storages and marketing infrastructure should come up to best standards in the world so that the loss of fruit and vegetables which is presently between 8 to 37 per cent, can be turned into a source of revenue."

India processes only a minuscule - 1.8 to 2 per cent - of the food produced, whereas Thailand processes 30 per cent, Brazil 80 per cent while the USA and UK process as high as 60 to 70 per cent of food produced, exhausting sizeable amount of their central outlays.

Business Standard 25.04.2000



SIDBI may set up VCFs for Food Processing Biotech Sectors

The Small Industries Development Bank of India (SIDBI) is toying with the idea of setting up of a venture capital funds for the biotechnology and food processing sectors, along the lines of its National Fund for Software & Information Technology (NFSIT).

Sailendra Narain, Chairman & Managing Director, Small Industries Development Bank of India, told representatives of the Small Scale Industries (SSI) Association here on Sunday that Small Industries Development Bank of India will partner industry associations in its efforts to create an awareness about WTO provisions. It will also assist in setting up of an exhibition-cum-marketing centre for SSI products proposed by the Maharashtra Chamber of Commerce Industries and

agriculture (MCCIA), he said.

Referring to the credit guarantee and announced in the Budget, Mr. Narain said it would help attract more collateral-free bank finance for small units. The fund, whose modalities are being finalised now, will be operated by Small Industries Development Bank of India, which will build its corpus of Rs.2,500 crore over the next five years. He assured SSI representatives that Small Industries Development Bank of India was well placed to meet the estimated additional term credit requirement of around Rs. 35,000 crore for the Ninth Five Year Plan.

Industry representatives suggested that Small Industries Development Bank of India could establish an exchange to facilitate the buying, selling or merging of industrial units, as necessitated by the changing economic scenario.

Mr. Narain added that Small Industries Development Bank of India has set up a committee headed by RH Patil to help SSIs assess capital markets.

This will benefit those small units keen on corporatising to raise equity.

The Economic Times 25.04.2000



Prisma Launches Food Products

Prisma, a newly formed proprietorship company located here, has launched a range of vegetarian food products including some

instant foods which are free of preservatives.

According to Mr. Pradeep Singhi, promoter of Prisma, the foods and beverages (mostly sherbets and coolers) made by Prisma were home-cooked, had a year-long shelf-life and kept well up to three months after opening, under refrigeration.

In the instant food category, the product range included uppama, chutneys, a range of north Indian food such as muthri churma (a wheat preparation), bajraa khaakra (a thin pancake) and instant daal. Most of these foodstuffs can be readied for eating by just adding warm or hot water.

The company is also planning to introduce instant tea. The product, which has been under testing for eight months, is now taking final shape. A dealership network for marketing these products in the metros would be in place within a month.

Prisma's future plans include becoming a one-stop shop for all household products including furniture, computers, white goods and garments. Most of these items are proposed to be sourced from the unorganised sector.

The Business Line 22.05.2000



Cane Juice Bottling Developed

A simple method of bottling sugarcane juice, a nutritious thirst

quenching drink, for use as a soft drink has been developed by the Sugarcane Breeding Institute here.

The possibility of using sugarcane juice as a beverage was limited due to its seasonal availability and fast deterioration by microbial decomposition.

However, the bottled juice, made by the method developed by the institute, has been found to remain without much deterioration for at least six to eight weeks, with its taste intact.

Storing bottles under refrigerated condition would prolong the life for a period of three to four weeks, according to an article in the recent issue of newsletters of the institute.

The initial investment for bottling about 500 bottles of juice daily is approximately Rs. 5,000 to Rs. 6,000. The cost of 300 ml of juice will then work out to about Rs.3 to Rs. 4 the article said.

The Business Line 23.05.2000



Dozens of Mango varieties face threat of extinction

Two dozen varieties of the Mango are on the verge of extinction if steps are not taken for their commercial exploitation in the near future.

Already varieties like jauhari safeda, shamsul asmar, khasa, surkha, Imamuddin Khan, Aab-e-Hayat, aamin dandewali, prince, kalwa pahari, gol bhadaian, bemisal, gulab

khas, kala pahar, Taimur Lung, Khajra Kamal, Ram bhog, dosada bhadri, karela, krishna bhog, sharifa and balhar are rarely seen in the market. All these varieties are confined to private orchards where mango connoisseurs relish their taste, but are not inclined to venture into commercial production.

While a couple of these varieties can be found in different orchards, nobody is willing to grow an entire baag on commercial scale. Once these trees vanish, these varieties are bound to become extinct. Most of the nurseries in and around Malihabad are selling only dussehri, chausa or langra saplings. Even in government nurseries, sale of non-commercial varieties is not encouraged.

When asked why orchard-owners are not inclined to grow these varieties, a commission agent Jagdish Sahni said, "the young generation doesn't know about these varieties and they don't want to purchase a mango which they have never tasted or seen. Since there is no demand, the growers also shy away from them, instead going for popular varieties like dussehri, chausa, langraor Lakhnawwa safeda."

Dr. S.S.Negi, director, Central Institute for Sub-tropical Horticulture, Rehmankhhera, also agreed that those varieties which are not grown commercially are bound to vanish. He informed that the institute has a germ plasm collection of nearly 700 varieties, which is largest in the world. Since in-vitro conservation of mango genes is not

developed so far, these varieties, he said, are conserved in field gene banks, spread in about 130 acres. Dr. Negi emphasised that conservation was necessary in order to meet any future eventuality. He feared that rapid urbanisation, industrialisation and gene distortion due to mass production could harm popular varieties. In that case, he said, a gene bank would be of great help.

On being asked why this globally famous institute was not encouraging mass production of rare varieties, Dr. Negi who has virtually nurtured this institute in his decade-long stay as director, said mass production of these varieties is not commercially viable since these have very short table life compared to dussehri, chausa or langra. He informed that out of nearly 700 varieties, only 20 are commercially viable and grown in different parts of the country.

According to Kaleemuddin Khan, owner of Abdullah nursery in Malihabad, the extinction process had started way back in the second decade of the last century when Malihabad tehsil alone had about 1300 varieties. "Today we have about 700 varieties and if no concerted effort is made to preserve them, the figure would come down to 100 in the next few years. Already we have lost mangoes like kali ghata, angbeen, ghamtarash, pansheera, badlur asmar, asrul mukarrar, kewra, mohmood-us-samar, shyam sundar, aamin gudarshah, suhagsisi, rutab, kelwa misri, Kelwa champa, halwa, aanda etc forever," he says.

A concerted effort to popularise old varieties both at government and private level, is lacking in the entire 20,000 acre mango belt from Kakori to Rahimabad. While the state government orchard at Malihabad is of not much help, the institute is only preserving rare varieties for posterity, but is doing nothing to facilitate their mass production.

When asked what could be done to make rare varieties popular, Kaleemullah, who last year presented to President K.R. Narayanan a rare tree which had 54 varieties grafted into it, said that commercial production of prince variety should be taken up. "This variety like dussehri perishes very late and is equally delicious in taste."

The Times of India 23.05.2000



Govt. mulls panel to spell out funding Mechanism for Food Processing Sector

The government is mulling floating a special three member committee to look into the bottlenecks in the areas of cold chain infrastructure, funding and backward linkages in order to strengthen food processing sector in the face of QR removals under the WTO.

"Even as the list of members still remains to be finalised, a special committee would go make a comparative study of the policy framework, legislation, funding and other aspects of food processing vis-a-vis the policy in other parts of the world," said highly placed sources in

Department of Food Processing Industry.

The department of food processing in a recent survey has found that there has been a slow progress in the scheme meant for assistance in the backward linkages. Out of this, only three units have been allotted assistance," sources said. This has led to under utilisation of the funds allocated to the scheme, the department said.

The department has also pointed out that it has sought Rs. 110.5 crore in the previous fiscal as plan outlay for the scheme for 1999-2000 but the Planning Commission had approved only Rs. 47 crore. Against the budget estimates of 44.10 crore for the plan schemes, the ministry could only utilise Rs. 30.80 crore in the year previous to 1999-2000. The department has also observed that in the last three years, the capacity of the ministry to utilise funds has come down by a considerable amount.

The schemes does not ensure remunerative prices to the producers by creating direct linkages between them and the processors. With this, the department feels that there should be quicker approval of cases and should be a fixed time-frame for processing of cases.

The Financial Express 24.05.2000



Lever to double foods turnover in 3 years

Lever's turnover. In India, this business contributes only around 17

per cent to the company's turnover, while it accounts for around 40 per cent of Unilever's global sales. The phenomena of down trading and a high level of penetration already achieved in both soaps and detergents and personal care products business have slowed down HLL's topline growth. Analysts fear that this could impact HLL's strategy of doubling its turnover and profit every four years. Banga said the other existing lines of businesses would not be neglected and the company would make significant investments to grow them as well.

The Business Standard 25.05.2000



'Bestfoods in \$10-b Pillsbury move'

Bestfoods has asked Britain's Diageo Plc if it is willing to sell its Pillsbury baked goods unit for some \$10 billions, as part of the US company's defence against Unilever Plc's approach, FT.com reported on Wednesday.

The Financial Times Web site quoted unnamed people close to the talks as stressing that the Pillsbury move was one of several options Bestfoods was exploring, as Unilever played a waiting game for its target to come up with a viable defence strategy.

FT.com said a formal offer for Pillsbury was likely to face opposition from Bestfoods shareholders.

It said several large Bestfoods investors had said they were hoping

the group would instead attempt to extract a higher offer from Unilever than its current \$66 a share proposal.

The Business Line 25.05.2000



Bid to identify NE Agri Marketing needs

Faced with a dismal agricultural marketing scenario in the North Eastern region that has stalled agro-development, officials of the NE State Governments and representatives of cooperative marketing institutions active in the region put their heads together, during a day-long conference here today, to identify the marketing needs of the region and formulate a suitable strategy to meet them.

Delegates in the conference were one in their opinion that there is ample scope to expand the agri-marketing network in the region that is still in its infancy. Agencies like APEDA, NHB, SFAC, TRIFED, NERAMAC, AFC, NEDFI, etc. made presentations on their developmental roles and marketing support activities.

The people of the NE States are not able to market their produce profitably due to inherent factors. They are also subjected to economic exploitation by private traders who purchase their produce and handicrafts at throwaway prices. Admittedly, the presence of cooperative marketing agencies has not been able to better the situation enough.

"The operation standards of

organisations perhaps does not match the ground situation in the region," said Assam Agricultural Production Commissioner Sri S.K. Purkayastha, in the meeting. He called for rules and regulations more attuned to the needs of the people. He also admitted that markets for agricultural products are few and fragmented. Regarding food processing units in the region, that can really go a long way in boosting agricultural marketing, Purkayastha said their history has not been particularly good.

Managing Director of the NAFED, Sri Priyadarshi Thakur, called for revitalisation of cooperative societies in the region to bring about the desired results. He called for immediate measures to tap the domestic market for agro-products from the NE adding that there is a good market for quality products.

The Assam Tribune 25.05.2000



PFA Rules Amended

The government has amended the Prevention of Food Adulteration (PFA) rules, 1995, making it mandatory for manufacturers to indicate whether food product is vegetarian or non-vegetarian. As per the amendment in Rule 32 in PFA 1995, the added provision says that whenever any article of food contains whole or part of any animal, including birds and fresh water or marine animals or eggs as an ingredient, a declaration to this effect shall be made by a symbol and colour code to indicate that the

product is non-vegetarian. The symbol shall consist of a circle with a single chord passing through its centre from top left hand side to the right diagonally, an official release said here today.

The Economic Times 26.05.2000



Food Processing Policy in 3 months

The centre will announce its first food processing policy in three months time the Minister of State for Food Processing, Mr. Sahabaz Hussain, has said.

"The approach paper is ready and the draft will be finalised after inputs from the industry and State food processing machineries," Mr. Hussain told PTI.

The Minister said, of the entire food processing market in the country, only 1.8 per cent was currently being tapped.

In the "absence of proper storage facilities and cold chains, thousands of tonnes of food are wasted every day while being transported from agricultural land to the market."

The new policy envisages setting up of food training centres at district levels. The Centre, Mr. Hussain said was also planning to open branches of the Mysore based Central Food Training Research Institute (CFTRI) in the eastern region.

"During talks with the West Bengal Food Processing Minister Mr. Abdul Razzak Mollah, my Ministry has proposed setting up the food

training centres and a CFTRI branch in the State," he said adding a high level delegation from the State would soon meet him to finalise the modalities.

Mr. Hussain said the new policy would look at correcting industrial level faults to optimise revenue from the food processing industry and cut down excise and subsidy related bottlenecks for industries specially in the north-east.

The Minister said the Centre had already slashed interest rates for loans in the sector to four per cent and relaxed subsidy grants in order to attract small and medium scale industries from the north-east.

It was also considering bringing all food processing agencies like APEDA and MPEDA under one nodal agency to facilitate organised functioning of the sector.

Mr. Hussain said small and medium-sized biscuit industries which currently faced a disparity in various Government schemes would be treated at par once the policy was enforced.

The Business Line 26.05.2000



Food Processing Sector to have new bill soon

Regulatory framework for duty structure, technology coding, food specification

Government is planning to put together a bill for the food processing sector which aims at a regulatory framework for the duty

structure.

"The bill as and when in place will also address issues pertaining to technology coding and food specifications," said Omesh Saigal, secretary, department of food processing industries.

Saigal said that the background paper has been finalised by the government and a final go ahead signal was awaited. With a skewed taxation structure in the food processing sector and the multiplicity of laws. Saigal pointed that only 1.5 per cent of total fruits and vegetables produced in the country managed to get processed.

Saigal also said that due to the high excise duty structure in the sector there existed a big difference between the prices at the farm level and those paid by the final consumer.

The government would also be strengthening the financial infrastructure in the sector and provide specially-rebated loans for the development of this sectors. The department has also pointed out that it has sought Rs. 110.5 crore in the previous fiscal as plan outlay for the scheme in 1999-2000, but the Planning Commission had approved only Rs. 47 crore.

Seen against the budget estimates of 44.10 crore for the plan schemes, the ministry could only utilise Rs. 30.80 crore in the year previous to 1999-2000, sources said.

The department has also observed that in the last three years, the capacity of the ministry to utilise

funds has come down to a considerable degree. The government would also be strengthening financing mechanism of the projects which was a major problem as the projects in the food processing industries were highly risk prone.

The projects also face long-gestation periods and the returns were quite small. Besides this the government is reconsidering its decision and accord ministry status to the department. It also plans to advise the department to present their case strongly so that it regains the lost status in the larger interest of the food processing sector.

The Financial Express 27.05.2000



Aid for NE Food Processing Units

In a bid to breathe new life into the dying food processing industry in terrorist-infested Jammu & Kashmir and the north-eastern States, the Centre has drawn up enhanced rates of assistance for such units.

The Centre has chalked out a differential scale of assistance for projects to be set up in general and 'difficult areas' of the country, "Minister of State for Food Processing Shahnawaz Hussain told PTI in an interview here.

The Sentinel 27.05.2000



Safe Genetic Foods?

Biotechnology is not totally new to us. The preparation of food stuffs like bread, cheese and tasty south

Indian dosas through fermentation are known to us since time immemorial. Modern bio-technology is defined by WHO as, "the integration of natural sciences and engineering sciences in order to achieve the application of organisms, cells, parts thereof and molecular analogues for products and services". In other words we can put it as gene manipulation or gene modification. Foodstuffs that contain an ingredient of a genetically engineered food organism or foodstuffs that have been produced using a processing aid made with use of genetic engineering and known as "Genetically engineered foodstuffs" (GEFs).

Genetic engineers believe that they can improve the quality of the food we eat with the technology. Many multinational corporations in the food production business have invested huge sums of money in the development of these technologies with an intention to make huge profits.

However, in Japan processed Foods made with genetically engineered tomatoes have been withdrawn from sale in response to criticisms from retailers and consumers. In 1997 over 800,000 acres of herbicide resistant genetically engineered cotton were planted in the US. In this variety of cotton, the levels of biological pesticide were insufficient to control the bollworm and farmers in Mississippi, Tennessee, Arkansas and Louisiana reported that the bolls were falling off their plants. Farmers in those states have reported huge financial losses due to crop failure. When

scientists released genetically "improved" soil bacteria into the soil they found unexpected death of wheat plants and beneficial fungi. Genetic modification in crops led to allergic reaction and people who are allergic to a food product may become ill or even die from consuming a very limited amount.

The above examples show that biotechnology is not a solution to our food woes. Debate is continuing around the world about the hazards the genetic foods are going to cause to human health. The central issue of all the debates is the issue of people's right to know, about what they are consuming, what they are releasing into the environment and whether or not genetically engineered foods produce and crops pose, hazards to human health. The scientists are unable to predict the effect of genetically engineered foods on the human body. There is no basis for meaningful risk assessment and the claims for genetic engineering are unproven and can be misleading.

As on now no national safety regulation for the assessment of GEFs exists. One of the suggestions made by the most organisations is labelling. The fundamental purpose of labelling is to tell consumers what is in the food they buy. For those people who are allergic to certain foods, the information is essential to protect their health. Consumer's International supports the principle that genetically engineered foods must be as safe as their traditional counterparts. Consumers International strongly urges that

priority be given to the development of new test systems to test for toxicity of GEFs, such as in vitro tests, new ethically acceptable animal tests or ethically acceptable human volunteer tests. Consumer international recommends that organisms that cause common allergies should not be used as a source of genetic material to be inserted in other food organisms unless human testing shows that the transferred protein is not the allergen.

Coming to the needs of our country, we should appreciate the role played by our voluntary consumer organisations in highlighting the side effects of GEFs and enlightening the consumers about the measures to be taken by them before eating genetic foods. India is a big country with a huge illiterate population. Hence the suggestions like labelling may not serve effectively. We should wait and watch before laying down policy measures. Till then we should follow the guidelines laid down by the Consumer International.

A few among them are a) the establishment of case-by-case authorisation procedures for all GEFs, which include assessing allergenicity, toxicity, nutritional content and market genes; b) the setting up of expert advisory committees at both the national and state level, consisting of experts representing different walks of life including consumer representatives; c) the establishment of strict requirements for publication of safety data and official decisions.

Data should be clear and accessible to common man and d) the requirement that the manufacturer be liable for any negative health effects.

The Economic Times 27.05.2000



Bengal Panel Moots agro-industry promotion policy

The task force on the agro-industries sector, set up by the West Bengal Government has suggested a clutch of measures to boost exports. It has stressed the need for an integrated agro-industry promotion policy.

Noting that under the WTO regime, the subsidies which are supporting the European growers are expected to be reduced, it has opined that agro-industries offer a good opportunity for West Bengal, which has the "singular advantage of fine agro-climatic regions". West Bengal has scope to tap the markets of South-East Asia and Japan.

West Bengal produces most of the fruit varieties, barring apples and grapes. In vegetables too, the range is wide while in spices, barring small cardamom, all others are grown in the State.

The task force, which comprises the Government functionaries and was headed by the chief secretary has suggested the setting up of a cabinet committee for taking policy decisions regarding promotion of agro-industries.

The report regrets that although

the State has reached a stage where farm production generates marketable surplus for processing and value-addition, poor infrastructure and funds shortage are responsible for the tardy growth of agro-industries.

The task force, which submitted its report recently to the State Government is among the six such panels set up as a follow-up action after the 'Destination West Bengal' meet at Raichak in South 24 Parganas district in January 1999.

The panel has emphasised the need for formulation of an export strategy which lays adequate stress on the development of the agro-processing sector. It sees scope for a short-term plan focussing on mango, pineapple and tobacco.

Mooting the idea of creating special purpose vehicles for involving the private sector in agro-industry, the report has pointed out that investment is needed not only for setting up the units but also for infrastructure such as irrigation and rural roads.

The policy that the State Government has to formulate should address the entire gamut of issues relating to land, technology, farm management, infrastructure, cold chains, funds manpower and marketing.

The recommendations include making degraded land available for agro-industry, relaxing the land holding ceiling and approaching the Centre for creating adequate cold storage facilities at the States sea and

airports and also at the Petrapole border near Bangladesh. It has pointed out that as per an assessment done in 1997-98, the State has 1,60,271 hectares of cultiyable waste land.

The State Government should also move the centre for increasing the air freight subsidy while introducing an ocean freight subsidy. Regarding improving funds flow to the agro-industry sector, it has favoured promotion of venture capital funds.

The West Bengal Industrial Development Corporation and Food Processing Industries and Horticulture Department should initiate discussions in this regard with financial institutions. The loan application and documentation procedure should be simplified.

The Business Line 29.05.2000



Bihar's potential in Food Processing

The Union Minister of State for Food Processing, Mr. Shahnawaz Hussain, has said Bihar could emerge as the country's leader in food processing with its enormous natural resources.

Addressing day-long national seminar on 'Potential for food processing in North Bihar' organised by the Confederation of Indian Food Trade and Industry (CIFTI) here, Mr. Hussain said if southern States such as Karnataka and Andhra Pradesh could take a lead in the field of information technology, then

Bihar could do the same in food processing now the third largest industry worldwide.

The Minister also announced an eight-point policy decision of his department which sought to salvage 30 per cent loss of post-harvest food products and improvise the quality as well. He ruled out that bifurcation of the State would spell disaster for North Bihar.

Citing the example of Punjab and Haryana, he said North Bihar could indeed be a pioneer in the realm of food revolution.

The Business Line 29.05.2000



2KR project in Kuppam proves to be a success story

The 2KR project being implemented in Kuppam Assembly constituency of Andhra Pradesh chief minister N Chandrababu Naidu aimed at improving the all round living standards of the farmers, has produced encouraging results. The project being undertaken by BHC Agro India Pvt. Ltd. and other agencies with Isreal Technology, has completed one year.

According to informed sources the project has changed the lives of farmers involved. In addition to switching over to the modern state of the art agriculture technology, the farmers have adopted new patters of cultivation high value crops and learnt the modern plant protection techniques.

The 2KR project, as it is called

in view of name by the funding agency, has made the farmers rich and made them use limited water and land resources effectively.

The BHC onsite experts had provided advise to the farmers on the crops to be cultivated and know how for applying new technologies and modern cultivation methods. The farmers were told on the crops to be chosen, cultivated, pest control and fertilizers to be used. Complete onsite operational training was provided to the farmers, after installation of advanced drip and sprinkler irrigation systems.

The process of fertigation was applied through the drip system, wherein the fertilizer was applied through irrigation water. The major advantages of fertigation being better timing, uniform distribution minimum loss of nutrients due to leaching and high yields. The expected potential of exports is worth 1,000 tonne especially in crops like onion, popcorn, gherkin in the next two years, according to official sources. Venkatesh a farmer in Attrapalli village who raised potato in one acre area made Rs. 24,750 by producing nine metric tonne of Potato. Kodanda Reddy of the same village got Rs. 48,000 after sowing chillies in his two and half acres of land. The farmers of Mulbery, beans, tomato, baby corn, white onions, sugar cane ground nut, gherkins, etc are making fortune by following the techniques suggested by the BHC Agro Pvt.Ltd.

The Business Standard 29.05.2000



Centre to amend law on pests and plants

The Union Agriculture Ministry has decided to amend the Destructive Insects & Pests Act 1914 and plant quarantine regulations including the Plant. Fruits and Seeds (Regulation of Import into India) Order 1989 issued thereunder with a view to further facilitate global trade in plants and plant materials in the interests of farmers. It has also decided to synchronise the domestic plant quarantine standards with the nine global standards developed by the International Plant Protection Commission (IPPC) of FAO and develop a database of pest risk analysis (PRA) in respects of different crops in different regions.

So far PRA has been developed for 18 crops. The declaration of low-pest area or pest-free area in respects of crops through PRA data-base can boost exports. The ministry has noted that there has been a quantum jump in both imports and exports of plants and plant materials ever since the new policy on seed development (NPSD) was implemented in 1998-99 and the consequent economic liberalisation in 1990-91. The increase in imports of plants and plant materials of global standards has benefitted the farmers. Also the increase in exports of these products have earned considerable forex for the country.

The ministry has decided to strengthen the existing plant quarantine centres (PQCs) in Delhi, Mumbai, Chennai, Calcutta and Amritsar by providing modern

laboratory facilities and allied infrastructure.

It has also decided to open 33 new PQCs at important points of entries with a view to minimise the risks of introduction of exotic pests and diseases into the country.

In 1999-2000 68.49 lakh tonnes of 82.75 plants and plant materials were imported as against 48.78 lakh tonnes of 132.58 lakh plants and plant materials in the previous year.

About 31.02 lakh tonnes of 144.97 lakh plants and plant materials were exported as against 27.52 lakh tonnes of 159.14 lakh plants and plant materials. In the year 1999-2000, 63082 phytosanitary certificates (PSCs) were issued as against 55489 PSCs in the previous year for facilitating both exports and imports.

In March, 2000, a total of 674 samples of various agri-horticulture crops were imported from nine different countries namely, Australia, Canada, Egypt, France, Mexico, Syria, Taiwan, Thailand and US. Promising introductions like *Coryllus aveliana* (Hazel nut) varieties - Corabel N 473. Ennis N 505. Fertile De Coutard, jemtegaard 5n 438 Nerville De Bollwiller N 172 (EC no 451437 - 1442) from France were imported.

Under the germplasm exchange programme, 53 samples of different crops namely onion, paddy (DNA samples) and wheat were supplied to Bangladesh, Sri Lanka, Phillipines and Mexico.

The Financial Express 29.05.2000



Mango Production in Andhra hits all time low

Mango Production in Andhra Pradesh the second largest producing state after Uttar Pradesh has hit the all-time low. This has been attributed to a combination of factors like late flowering to adverse conditions and unscientific methods used for mango cultivation in the state.

While mango production hits a low every alternate year, the state had witnessed a good crop continuously for the last five years. However, this year the production has been put at just eight lakh tonnes which is hardly a fourth of last year's output.

Consequently, while prices in the domestic market have skyrocketed, exports are expected to be hit, according to state horticulture department. Exports which had shot up to 600 tonnes during 1998-99 from 50 tonnes in 1997-98 due to a bumper, high quality crop on successive years are almost unlikely. The sale price of mangoes has gone up sharply at Rs. 20 to Rs.25 a kg as compared to Rs 8 to Rs 10 a kg last season. To avoid the middlemen intervention on the price front farmers have been allowed to sell through mangoes-on-wheel and retail counters the sources said.

Markfed, the state marketing division for grains, horticulture, oils and spices, has opened a separate office at Andhra Bhavan in New Delhi to sell mangoes in the northern region and enable farmers to get better prices, the sources said.

The department is also

undertaking integrated training programmes, supported by APEDA and NIAM of Jaipur to farmers on production of export quality mangoes pre and post-harvest techniques and marketing strategies in all the districts. The department also launched hybrid crop varieties distribution scheme area-wise to enable farmers to improve the production target, the sources said.

The Financial Express 29.05.2000



HP to Produce off-season vegetables

About 5,50,000 tonnes off-season vegetables are likely to be produced in Himachal Pradesh during the current financial year. This production will be from 32,000 hectares of land.

The State recorded a gradual increase in the off-season vegetables crop output and land area under it during the past three years, according to an official spokesman here.

The State Government has launched various schemes to boost the production of off-season vegetables. Under these schemes, improved seeds, fertilisers, pesticides, insecticides and fungicides are being provided to farmers besides 50 per cent subsidy to the IRDP families for the purpose.

The State Agriculture Department has been providing technical know-how to the vegetable growers to grow diversified crops and superior vegetable hybrids and create better marketing facilities

through co-operatives.

The spokesman said the State Government was establishing green houses which would play a vital role in the production and protection of nurseries.

The Business Line 30.05.2000



Customs Duty on Milk Products to be Hiked

Government will take steps to increase customs duty on milk products, butteroils and poultry items to adequate levels with a view to protect the interests of farmers, assured the new agriculture minister, Nitish Kumar.

Kumar who assumed the office of Union Agriculture Minister for the second time said that the draft of the proposed new agriculture policy has already been sent to the Planning Commission for approval. Pending the approval of this policy, his ministry will set up a task force of scientists, experts and cultivators to assist and advise the government on relevant issues pertaining to agriculture.

The minister said that according to the WTO bound tariff rates, government can increase import duty on dairy products up to 60 per cent and that on poultry items up to 100 per cent. On poultry products, anti-dumping duty can also be imposed if necessary. The government is aware of the current situation of inflow of cheap products of dairy and poultry backed by heavy subsidies in exporting countries, after

India removed the quantitative restrictions on imports of these products. But the government has to consider what possible adverse can these imports have on farmers and to which extent the government can raise import duty on these products without acutely affecting the price scenario in the country.

The minister stated that sustainable growth in agriculture, food security with increased nutritional value, increase in agro exports and welfare of individuals associated with agriculture will be the foremost task of his ministry. Action will be initiated to ensure doubling food production in the next 10 years and the major thrust will be to achieve a minimum of 4 per cent growth in agriculture, strengthening of credit structure and protecting the interests of farmers and all associated with agriculture in wake of removal of quantitative restrictions on imports as per WTO agreements.

He said that emphasis will be given to organic farming for sustained growth of agriculture and providing farmers with better quality of seeds and fertilisers.

Nitish kumar made a dig at the monsoon forecasts of the India Meteorological Department (IMD). He questioned why could not the IMD predict the severity of drought? Instead IMD stated that 1999 was 'normal' monsoon, how could drought affect as many as 11 states in the country, he quipped and said that he would soon convene a meeting with IMD officials to

discuss this issue.

He assured that all the drought affect states would be provided with required seeds, fertilisers and other inputs for the coming kharif season. The government is strictly monitoring the drought situation in the country with adequate care and attention and is doing the needful.

Later, Nitish Kumar told the Sri Lankan delegation led by its fisheries and aquatic resources development minister, Mahinda Rajapakse that there is a need of friendly approach to accomodate each others problems and find an agreeable solution to the common issue of fishermen crossing territorial water inadvertently.

The Indian Express 30.05.2000



Unilever Silent on higher Bestfoods bid

Anglo-Dutch consumer products group Unilever NV/Plc declined to comment on Monday on reports that it would raise its bid for US Bestfoods Incorporate to \$70 per share. "I can neither confirm nor deny it," a Unilever spokesmand told Reuters. Britain's Sunday Telegraph said the offer, which would value Bestfoods at around \$19.5 billion, would represent a 42 per cent premium on the original pre-offer price for Bestfoods. Unilever co-chairman Niall FitzGerald has for the moment, ruled out any hostile takeover of the US firm, which has reportedly held merger talks with H J Heinz and bakery link-up talks with Diageo Plc's Pillsbury unit.

The Economic Time 30.05.2000



Britannia tastes 37% net growth

NUMBER CRUNCHING

	Year Ended March	
	2000	1999
Net Sales	1,169	1,030
PBT	79	57
Net Profit	51	40
Equity	28	19

Foods major Britannia industries on Tuesday reported a 37 per cent growth in net profits to Rs. 51 crore for the year ended March 2000 against the previous year's Rs.39 crore. Sales for the same period grew by 14 per cent at Rs. 1,170 crore. Interest burden during the year was Rs. 7 crore vis-a-vis Rs. 6 crore in the previous year. Depreciation was placed at Rs. 17 crore against 16 crore last year.

The Newstime 30.05.2000



'Centre planning Food Processing Units in States'

The centre is planning to develop food processing units in different states with special emphasis on West bengal and the north-eastern states, the Union Minister of State for food processing said here today.

His ministry will chalk out a policy by September to ensure the growth of the Rs. 2,000 crore food processing industry.

Mr. Shahnaz Hussain said he had met his state counterpart Mr. Abdul Rezzak Mollah, for setting up training centres in different districts.

He said 30 per cent of the fruits and vegetables are damaged during transportation to the markets owing to the absence of cold storage facilities. Mr. Hussain's department is now planning to develop such facilities. A scheme for undertaking research and development projects in food processing is also on the anvil.

The Centre offers subsidies and financial assistance for such units but many people are not aware of it, he said.

The Statesman 30.05.2000



New Mango variety with export Potential Developed

A new mango variety CISH-M-2, a cross between Amrapali and Anardan Pasand, will soon be introduced in the market for commercial cropping, informed S. Negi, director, Central Institute for Sub-tropical Horticulture, Lucknow.

Talking to *The Times of India*, Mr. Negi said the new variety is yellow with a red blush. It has firm

flesh and scanty fibre. The red blush and hard flesh are developed keeping in mind the export potential of this variety as Europeans and Americans do not like yellow colour and soft pulp, Mr. Negi informed.

The institute has also developed a late-season variety CISH-M-2, a cross between Dussehri and Chausa - two very popular varieties of the Malihabad mango belt. Having dark yellow colour, this variety also has firm flesh and less fibre, claimed Mr. Negi. This variety is undergoing field trials.

The institute has already released Dashehari-51, a high-yielding and regular bearing clone of famous Dussehri for commercial cultivation. Mr. Negi claimed that this variety has 39 per cent more yield annually than the normal Dussehri variety.

This variety was developed after 17 years of trial, he added. However, private growers in the mango belt have not shown any enthusiasm for this new variety so far.

Mr. Negi said, "Besides, cargo facilities at the Lucknow airport, the mango belt also needs a cool chain system from plucking point to the destination point. Unless this facility is developed, mango export would not be possible from here. For export, the temperature of the fruit

needs to be brought down at 12 degrees Centigrade soon after it is plucked. After pre-cooling, this should be packed properly and carried in refrigerated containers to the destination point of export."

Growers in Maharashtra have developed this chain and are exporting Alfansa successfully, he added.

The Times of India 30.05.2000



Brown & Polson launches Fresh Delite

International Bestfoods Limited (IBL) has launched Brown and Polson Fresh Delite Instant Orange Drink Powder, a new instant health and energy drink with the taste of freshly squeezed orange juice. The Fresh Delite instant orange Drink Powder is available in packs of 500 gm, 200 gm and 100 gm. A glass of Fresh Delite costs about Rs. 3 making it 40 per cent less than a glass of other imported powdered or branded aerated drinks. It is currently available in the six metros and will be launched subsequently in the rest of the country, in a phased manner.

The Financial Express 31.05.2000



INDUSTRY NEWS

Pataks to enter Indian ready-to-eat foods

Pips Lever, ties up with Amalgam

The 50-million pound Patak group of the UK has pipped Hindustan Lever Ltd (HLL) to tie up with the Kochi-based Amalgam group. The deal would see the Pataks foray into the Indian household with an array of ready-to-eat Indian foods.

According to reliable sources, the British group, said to be one of the largest Indian ethnic food makers in the world, would infuse funds into various companies of the Amalgam group.

The funds would be utilised in improving the existing facilities of the Amalgam group and entering other areas. The exact quantum of funds that would be invested is not immediately known.

Amalgam has about seven to eight private companies in its fold, all of which are closely held. One of the group companies, Innovative Marine Foods Ltd. is publicly held. The combined turnover of the group is around Rs. 180 crores. The group was founded in 1977 by Mr. Tarakan and is in the business of freeze drying, frozen sea food, feed and marketing of chilled and frozen food.

It is also learnt that Amalgam underwent a restructuring exercise

after the group ran into rough weather. It had suffered a major setback in exports to the US a couple of years ago, sources added.

ICICI and Exim Bank had undertaken the restructuring work of the Amalgam group, sources said. It is reliably learnt that HLL had evinced interest for a tie-up with Amalgam.

The Pataks would use Amalgam's facilities and launch the Patak brand in India and would also commence seafood exports to other parts of the world. This is also the first venture of the Pataks in India.

Post-restructure, the set-up would resemble a 50:50 joint venture across all the companies. Patak's Indian Foods is based in Lancashire, England. It is a family-owned. Indian food ingredients company.

Business Standard 04.04.2000



NOGA launches NFC category of fruit juices

Nagpur Orange Growers Association (NOGA) has launched on Tuesday the 'Not From Concentrate' (NFC) category of juices in three flavours-orange, pineapple and mango - in Indian markets.

These NFC juices are made available in 250 ml tetrapacks.

NFC juices from NOGA are rich in natural nutrients, making them ideal for children of growing age and persons requiring extra energy to fight work stress.

In order to provide natural juices to consumers, developed countries attach special importance to the NFC category of juices. NOGA on its part, has been striving to supply quality processed food items to the public in view of the limited availability of original fruit juices and flooding of the market with juices reconstituted from concentrates.

Observer

05.04.2000

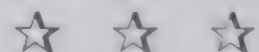


Sweet Sauce

Weikfield has launched a sweet chilly sauce named First Choice. The sauce, which is devoid of tomatoes, is made of red chillies, garlic and vinegar and is reportedly free of preservatives. First Choice can be used with continental, Chinese and Indian cuisine. The sauce is available in 250mg bottles at prices of Rs. 36 and reportedly has a shelf life of two years.

Business Line

13.04.2000



Oman Dairy plans to set up unit

Oman National Dairy Products

Company Ltd (ONDP), the largest manufacturer of ice-creams and fruit juices in the Gulf, is examining the possibility of setting up a manufacturing unit in India, if the demand for their products picked up in the country.

Already talks were in progress with the Indian government and the Kerala and the Gujarat state governments for setting up the plant.

"Though nothing is finalised as yet, something will be concretised in the next two years," Oman National Dairy Products Company Ltd general manager M N Ramachandran told a press conference here on Saturday night while launching some of the products in the Chennai market.

Already the company product, Zain, had been launched in New Delhi, Mumbai, Kerala and Maharashtra, he said.

Mr. Ramachandran said the company, with a turnover of Rs. 200 crore, was exporting its products to 40 countries in the world.

Twenty five per cent of the turnover came from markets outside the Middle East.

The Oman National Dairy Products Company Ltd general manager also claimed that the zain products in tetra packs were free from preservatives and had a shelf life of one year.

Observer 17.04.2000

India emerges largest fruit producer

India has emerged as the largest producer of fruit and coconuts in the world. According to a special report on "Agriculture" released by the Union agriculture ministry, the coconut product was 13 million nuts annually. Marginal land has extensively been utilised for production of many fruit. Adoption of drip irrigation has increased productivity of mango by 51 per cent, grapes by 81 per cent, citrus fruits by 41 per cent and coconut by 116 per cent. The country also produced 47.6 lakh tonnes of onion during 1999-2000 which is an all time record. In vegetable production India achieved the status of second largest producer of vegetables. An area of 37,000 hectares was brought under high yielding improved and export oriented varieties of various spices during the year 1999-2000.

Economic Times 18.04.2000



Amalgam merges with Patak of UK

Amalgam Food Ltd, a seafood processing and exporting firm, has formally merged with the UK-based Patak group following the signing of a joint venture agreement here on Monday.

The agreement, subject to the requisite regulatory approvals, provided for the Patak group acquiring 50 per cent of the stake

in Amalgam group, an official press release said.

The agreement was signed by Mr. Abraham J. Tharakan, Chairman, Amalgam group and Mr. Kirit K. Pathak, Chairman and CEO of the UK-based company.

The venture would facilitate the production of Patak range of products in Amalgam's processing facilities.

In due course, the Patak range of products would also be launched in India, it said.

The Amalgam group had a turnover of Rs. 180 crores and owned and operated eight processing plants across the country. Most of these plants had ISO 9002 and EU approvals.

Amalgam products were marketed in the country under the brand name 'Sumeru' and in international markets under 'Ocean Diamond'

The Patak group is the largest Indian ethnic food manufacturing facilities in the UK, Scotland, marketed a wide range of products such as curry pastes, sauces in glass, pickles, chutnies and ready-to-eat Indian food in over 50 countries.

The company also had a joint venture with the US-based Hormel Food Corporation to distribute its entire product range in the US.

Business Line 18.04.2000



Delay in food development fund decried

A parliamentary committee has criticised the the department of food processing industry for delaying the setting up of the 'food development fund' as a result of which no money could be utilised or borrowed last year.

In its fourth report, the Standing Committee on Agriculture said it "is dismayed to observe that the recommendation for setting up the fund well within the first quarter of 1999 has not been implemented."

The ministry had earlier said that details and procedures were being worked out and action had been initiated for finalisation of the scheme.

The committee said undue delay has taken place in finalising a fund for which a token provision of Rs. 1 crore had been earmarked for the year 1999-2000.

From the fund, to be created in association with the Small Industries Development Bank of India (Sidbi) and Industrial Development Bank of India (IDBI), the processed food sector would be able to get finances at an interest rate lower than the commercial interest rate.

The committee had also recommended that the fund so created should be well publicised to generate more demand for funds and accordingly a very high allocation should be made under

this head at the revised estimate stage.

Business Standard 22.04.2000



Instant food from Super Coffeemix

The Singapore-based company, Super Coffeemix Manufacturing Ltd., has launched its 3-in-1 instant food products and beverages in the Indian market.

The company has appointed the Mumbai-based Ameya Trading Company Pvt. Ltd. as its exclusive distributor. The cereals and coffee will come in many variants. Instant cereals will be available in 20 g and 30 g sachets and will come in seven variants, each prices at Rs 10. A health drink with high-fibre proteins can be consumed anywhere with variants like glucose, brown rice, strawberry and mixed fruit.

The coffee products are packed in 12 g and 20 g sachets. The variants include Cafe White and Low Sugar Coffee sachets, Iced Coffee, Premium Branded Black Coffee and Hot Chocolate.

There is also ready-to-mix instant granulated coffee in pet jars and refill packs. The coffee sachets are priced between Rs. 5 and Rs. 12.

The company is also planning to make flavoured coffee in four flavours like Hazelnut, Mint, Irish Cream and Cinnamon.

Business Line 25.04.2000



Mahal Foods targets Rs. 100 Cr sales by 2001-02

The domestic arm of US-based Mahal Foods Inc is targetting Rs. 100 crore turnover by 2001-02 by launching a spectrum of packaged foods and beverages here, a top company official has said. "The company targets Rs 24 crore in the first year of operation in India, which would go up to Rs. 100 crore in fiscal year 2001-02," M.L. Arora, founder of Mahal Foods said.

Business Standard 24.04.2000



Dabur Foods may break even

Healthcare major Dabur's foods business is likely to break even this year, after a run of losses for over two years, largely due to cost-cutting measures, economies of scale and hike in product prices.

"We are sure to break even this year and this has been possible due to tight cost management and better capacity utilisation for 'Real' brand of fruit juices," chief executive officer and director of Dabur Foods Amit Burman told PTI. He said this was the company's first complete operational year as a separate company but declined to divulge the financials.

Burman had earlier admitted that Real brand had been a major loser since Dabur Foods' inception, with packaging and sourcing being the weak links in the brand's production chain. "We went far

wrong in our calculations for Dabur Foods since its inception in February 1998. We set 15 crore but could not achieve even 50 per cent of that," he had said before taking over the company in 1998.

Introduction of Real Juices marked the over Rs 800 crore Dabur group's foray into high-growth, convenience food products. Besides Real, Dabur Foods also markets 'Homemade' cooking pastes and table-top sauces and lemon juice preserve 'Lamoneez'.

However, Real was withdrawn in less than two months after its initial launch due to shelf-life problems and reintroduced with improved packaging under Burman's leadership.

Dabur Foods will complete its first financial year as an independent company, he said, adding that substantial profits were expected in the company's second year of operations i.e. 2000-01.

Newstime 19.05.2000



HLL builds ice-cream on health platform

How do you convince sceptical Indian mothers that their kids will not suffer from a bad throat or fall ill if they were to have an ice cream? Hindustan Lever, the largest player in the organised ice cream market with a stated 45 per cent share, has just launched a slew of products and is backing them up with aggressive advertising to put forth the proposition that ice creams are healthy and hygienic.

Changing well entrenched consumer barriers will indeed be a tough call but lever executives are convinced that unless they get the health and nutrition concept across, ice cream consumption will continue to lag in India. "We are focusing on the core needs of the consumer. Telling them that basically ice creams are wholesome, hygienic and good value," said Mr J H Mehta, executive director (ice cream), HLL. The company has started the exercise with its Max brand.

HLL's is actually building its Kwality Walls ice cream business around three brands - Max, Feast and Cornetto. Cornetto, its premium offering is positioned on an indulgence platform, Feast as refreshment for the youth, the teen with Max targeted at family, and children. The company is putting real ingredients - fruit juices and milk - into its products and fortifying them with vitamins, said Mr Vivek Rampal, marketing and sales controller (ice cream), HLL. HLL has introduced a Max Vitameter. Max Joos for example has real fruit juice and also 6 mg of Vitamin C which is 15 per cent of the amount of Vitamin C that one requires in a day. The Vitameter also acts as a self vitamin check wherein you can record the nutrients you get everytime you eat Max, say HLL executives.

One of the new offerings under the Max umbrella is BikiMax, which is literally ice cream sandwiched between two glucose biscuits. Prices at Rs. 5 and launched in February this year, "it

is flying," said Mr Rampal, who calls it "a global innovation." India is the world's biggest glucose biscuit market and using it with ice cream is meant to reinforce the health benefit to the Indian consumer. "We have run out of capacity for this product and a number of copy cats are already in the market," he said.

Max Rose, launched in March, has rose milk in it. In India rose is considered good as seen in the popularity of Roohafza. HLL has also rolled out Max Joos in sachets and Max POP.

Economic Times 20.05.2000



Desi flavour is Britannia's recipe to win dairy market

Britannia Industries, in its second coming in the Indian dairy market under the 'Milkman' brand, is introducing a range of products, many in desi flavours, to woo the Indian consumer.

The company which entered the dairy segment in July'97 has more or less completely revamped its offering in the past couple of months with the aim to provide consumers with value added products. Also products which will offer the company critical mass like butter and ghee, and those that give it viability at the distribution level and visibility at the retail level.

In cheese, Britannia today offers flavoured cheese spreads - masala onion, masala garlic, asli

pepper - meant to specifically cater to the Indian palate in addition to the good old plain cheese. Also flavoured cubes. The company is also bringing in new pack forms to reduce packaging costs. More products are in the offing. "We are looking at three four products this year," said P K Malik, senior vice-president, new business, Britannia Industries.

Cheese is a small product category in India at around 6,000 tonnes per annum with Amul being the dominant player. Britannia claims to have a 33 per cent share in organised cheese market.

Britannia has also completely reworked its milk strategy. Gone is the word 'flavoured.' It is now just Milkman chocolate milk or strawberry milk. This 7,000 tonne per annum category is growing with both out of home and at home usage rising. Britannia, which claims a 25 per cent market share in this segment, wants to have the first mover advantage in this market. It also aims to emerge as a national brand in a market which has strong local brands like Milma, Aavin, Nilgiris and others. Parle and Nestle are also expected to enter this segment shortly. "We aim to grow this segment. The rate of growth could go be as high as 30 per cent," said Malik.

Milk category faces competition from Colas and fruit juices and requires high spends. Combined with low net sales value it is a tough product category to be in.

Britannia recently entered the

ghee market in the country. "Our ghee is very granular and comes with the right aroma. The key driver being freshness and purity," said Mr Malik. "It takes 6-9 months to build a consumer base. We are now extending it to towns," he said. The small pack ghee market in India is estimated at 33,000 tonne per annum.

Ghee in India is used as a cooking medium and also as a taste and flavour enhancer. The regional dispersion of this market is conspicuous with north and west being the biggest. It is also highly fragmented with no national player except perhaps 'Anik.' Britannia will offer ghee made from buffalo's milk in the north and from cow's milk in the south. "Ghee offers us critical mass, gives us turnover," said Mr Malik.

Britannia is relooking its butter strategy because as Mr Malik admits, "we are nowhere compared with Amul." Butter was launched in a few, select towns mainly with the objective to mainly wiht the objective to strengthen "our cold chain." Now the aim is to establish it in a few cities.

One segment where Britannia has done really well is Milk Powder or dairy whitener. The company today claims to be number one brand in this segment in volume and tonnage with a 15 percent share in the 32,000 tonne overall market.

Having wet its feet, Britannia is looking for a larger play in the country's dairy market. "We are committed to dairy. We are

gradually understanding the back end of the business," said Mr malik.

The Economic Times 24.04.2000



Lever to double foods turnover in 3 years

Hindustan Lever has made significant changes in its growth strategy, with a sharper focus on the still-evolving foods business.

"The foods business turnover is now close to Rs 2,000 crore. We hope to easily double that over the next three years," the new chairman of the fast-moving consumer goods major, Manvinder Singh Banga, told Business Standard.

The thrust has become crucial to the company because of the slowdown in some of its mainline businesses, like soaps and detergents and personal care products, which contribute about 60 per cent to HLL's Rs. 10,952 crore turnover.

Pointing out that Kissan Annapurna has been identified as its flagship brand, Banga said: "I expect to see it emerge as a Rs 1,000 crore brand in three years."

Kissan Annapurna, which now has a turnover of Rs. 300 crore and covers various food products, will provide brand support to a slew of ready-to-eat products also to be launched soon.

"The tea business has seen significant slowdown over the last

two years (due to a controversial tax system which has just been withdrawn). We now see tremendous opportunity in the business," Banga added.

As part of its strategy, the company is evaluating the feasibility of setting up a countrywide chain of tea-vending machines. It will be initially restricted to urban areas. But Banga said HLL would have to alter customer preferences in the rural areas as well.

He indicated that the growth in the foods business was going to come more from staple food items than popular products like ice creams, beverages and others.

On the foods business, he said HLL planned to grow organically as well as inorganically. "We are actively looking at acquisitions in this sector," Banga added.

HLL acquired Modern Foods last year for Rs. 125 crore. With 114 units and 22 franchisees, Modern Foods will lead HLL's staple foods thrust.

Business Standard 25.04.2000



Diet chocolates from Jindal group

The Rs. 550-crore Jindal group is planning to reinforce its foray into the food sector by bringing diet products into the country. It recently introduced the Sorini Brand of Italian chocolates.

Mr. S. K. Jindal, Director of the group's flagship company - Jindal Exports Ltd - told Business Line that diet products in the chocolates jams and cookie categories would be brought into the country in the year 2001-2002.

Even as its group company, Jindal Dyechem Industries Ltd. is in the process of finalising a nationwide network for sorini chocolates, the company is also negotiating with German and Italian firms for diet category products, he said.

Jindal Dyechem Industries Ltd has an exclusive marketing agreement with Italy's Sorini S.P.A for its 'creme' and cereali' ranges of chocolate and seeks to corner its share in the Rs. 300. crore market. Sorini is a \$30-million company with a presence in Europe, Korea, West Asia, Australia, Japan and the US.

Besides marketing Sorini in India, the company also has a marketing alliance for Bangladesh, Nepal and Thailand, But this would not be until the next fiscal, he said. The company has introduced seven types of the Sorini brand and plans to introduce 10 more in August, he said.

Available at prices ranging between Rs. 170 (for 140g) and Rs. 300 (for 250g), the company is also introducing three piece pouches, in two months, to make them more accessible to the consumer. And to support these initiatives, the company also plans to commence manufacturing at its

unit in the Kandia FTZ.

Launched three months ago, the Sorini chocolates are at present available in 10 cities, including the metros and the minimetros. To support buoyant sales in the August-to-March period, the company also plans to embark on national level advertising. "By then the distribution network across the country would also be in place," he said. Till then, the company would settle for local advertising.

The Jindal group, comprising Jindal Menthol & Investment Ltd. Splendid Overseas (P) Ltd and Jindal Aromatics, besides the flagship company and Jindal Dyechem Industries Ltd. targets Rs. 750 crores in the current fiscal.

Business Line 01.06.2000



Bakemans plans foray into salty snacks

The New Delhi-based Bakemans Industries Ltd. has decided to plant its flag in the highly competitive salty snacks, or namkeens, market.

Confirming this to Business Line, Mr. R.N. Kansal, Executive Vice-President, Operations, Bakemans Industries Ltd, said that the company would introduce packaged namkeens in the very near future.

Despite being headquartered in New Delhi, the company is likely to launch its salty snacks in the eastern belt, senior officials at Bakemans told Business Line. "In

all probability, we will start marketing the new product line outside Delhi. The choice of the exact market, however, is still at the finalisation stage," they said.

The new snacks will span a variety of flavours and will be priced competitively. Keeping in tune with the industry trend, prices will be about 25 per cent higher than similar products sold in the unorganised sector.

Mr. Kansal refused to acknowledge that the price differential would prove to be a bottleneck for the brand. "The consumer we will target is in any case not very price-sensitive. The economies of scale in the domestic market are such that we do not need to tap all income classes," he added.

A separate manufacturing facility for the namkeens is being set up in Uttar Pradesh. A national roll-out has been ruled out in the initial stages,

and will happen subject to market feedback. "We also need to put the supply and distribution chain in place before going whole hog," company officials said.

They were tight-lipped about details of the investments Bakemans has pumped into the namkeens venture. "The investment is substantial, and we are serious contenders in the market," is all a senior official said.

Bakemans spends lavishly on advertising and promoting its biscuits brands and officials said that for salty snacks too, the company will too the same line eventually.

The domestic namkeens market is dominated by a thriving unorganised sector that, according to industry sources is about 10 times larger than the organised market. In fact, apart from the unorganised sector players in the estimated market size of 3 lakh tonnes,

branded players also face competition from made-at-home snacks. The organised salty snacks market estimated at roughly 30,000 tonnes per annum.

Though up against stiff competition from makret leaders Haldiram, followed by PepsiCo's Lehar Namkeen and Bikano from Bikanervala Foods Pvt. Ltd., Bakemans officials said their brand would edge past the others on a couple of parameters.

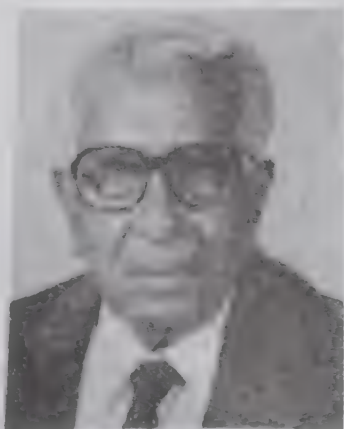
"Our stronghold against competitors will be quality. Since Bakemans is already a household name as far as biscuits are concerned, we are confident of penetrating deep into our target market," Mr. Kansal said. Another player that has recently stepped on to the salty snacks turf is Britannia Industries.

Business Line

02.06.2000



OBITUARY



Mr. Madan Gopal Nirula, founder of the food processing unit with FPO Licence No. 1 and chain of Indian Fast Food centres under the name of Nirula's passed away on 13th July, 2000. He was a dynamic personality well known in trade circles. He was conferred the "KASHALKAR MEMORIAL AWARD" in 1996 for his outstanding contributions to the Food Processing Industry.

The Industry has lost a very dynamic promoter and an important member of the Association.

AIFPA pays homage and pray for the departed soul to rest in peace.

GOVT. CIRCULAR

Ministry of Finance
(Department of Revenue)

RESOLUTION

New Delhi, the 24th February, 2000

No. 31/11/99-ST.- Finance Ministers' Conference held on 4th July, 1997 had adopted a Resolution commending constitution of a Working Group of Finance Ministers of States and Union Territories to evaluate the progress made towards and chart a time path for introduction of Value Added Tax (VAT) in all the States and UT's Government of India, Ministry of Finance, Department of Revenue vide Resolution F.No. 22/5/97-T dated 19th September, 1997 had accordingly entrusted this job to the Committee of State Finance Ministers constituted Vide Government of India, Ministry of Finance, Department of Revenue Resolution F.No. 31/56/3-ST dated the 4th July, 1994. The said committee of State Finance Ministers inter alia stated that implementation of VAT requires considerable co-ordination amongst States and recommended that a Standing Council of Commissioners (SCC) of Sales Tax should be constituted.

2. In pursuance of the recommendations of the Committee, the Government had decided to set up a Standing Council of Commissioners (SCC) of Sales Tax comprising Sales Tax Commissioners of all the States and Union Territories as its members and headed by the Union Finance/Revenue Secretary or Additional Secretary (Revenue) in his absence.

3. The terms of reference of the Standing Council of Commissioners will be:-

- (a) to provide a mechanism for collection of data and notifications for the management of VAT in the States; and
- (b) have the mandate to hold consultations amongst the States.

4. Prof. Mahesh C. Purohit of NIPF&P, New Delhi will be member Secretary and convenor of the Standing Council of Commissioners of Sales Tax.

5. The Standing Council of Commissioners will evolve its own procedures for its work and may call for information as may be necessary from State Governments/Union Territories.

6. The National Institute of Public Finance & Policy will provide Secretarial assistance of the Council.

Dr. G.C. Srivastava, Addl. Secy.



DRAWBACK SCHEDULE

2000-2001

AS ON 1ST JUNE, 2000

Serial/ Sub- Serial No.	Customs Tariff Heading/ Sub-heading No.	Description of goods	Rate of Drawback	Allocation	
				Cus.	C.Ex
	20.01 to 20.09	Fruits Pulps/fruit juice, fruit preparation, including mango/guava juice/pulps and their concentrates.			
		When CENVAT facility has not been availed :-			
20.01		(a) Packed in OTS Cans.	Rs. 12.50 (Rs. twelve and paise fifty only) per kg. of the net weight of empty containers.	12.00	0.50
20.02		(b) Packed in Aseptic Bag kept in M.S. drums.	Re. 0.90 (Paise ninety only) per kg. of the net content.	0.40	0.50
20.03		(c) Packed in Glass Bottles	Re. 0.80 (Paise eighty only) per kg. of net content.	All C.	Excise
		When CENVAT facility has been availed :-			
20.04		(a) Packed in OTS Cans.	Rs. 12.00 (Rs. twelve only) per kg. of the net weight of empty containers.	All Customs	
20.05		(b) Packed in Aseptic Bag kept in M.S. drums	Re.0.40 (Paise forty only) per kg. of the net content.	All Customs	
	20.07	Fruit Jams			
		When CENVAT facility has not been availed :-			
20.06		(a) Packed in OTS Cans	3.6% (three point six per cent only) of FOB value	3.3%	0.39
20.07		(b) Others	1.7% (one point seven per cent. only) of FOB value.	1.4%	0.39

When CENVAT facility has been availed :-

20.08	a) Packed on OTS Cans.	3.3% (three point three per cent only) of F.o.b. value	All Customs
20.09	b) Others	1.4% (one point four per cent only) of o.b. value	All Customs

20.08 C Fruit products, not otherwise specified. manufactured packed, marked and labelled, in accordance with Fruit Products Order, 1955, as amended from time to time, and the rules and regulations, made there-under or as per buyer's specifications duly approved by the licensing Officer of the Director (F&VP), (Deptt. of Food, Govt. of India)

When CENVAT facility has not been availed :-

20.10	a) Packed in OTS Cans.	Rs. 12.50 (Rs. twelve and paise fifty only) per kg. of the net weight of empty containers.	12.00 0.50
20.11	b) Packed in Aseptic Bag kept in MS drums	Re. 0.90 (Paise ninety only) per kg of the net content	0.40 0.50
20.12	c) Packed in Glass Bottles	Rs. 0.80 (Paise eighty only) per kg. of net content	All C. Excise

When CENVAT facility has been availed :-

20.13	a) Packed in OTS Cans	Re. 12.00 (Rs. twelve only) per kg. of the net weight of empty containers.	All Customs
20.14	b) Packed in Aseptic Bag kept in M.S. drums.	Re. 0.40 (Paise forty only) per kg. of the net content.	All Customs
20.09	D. Preparation of vegetables, fruits, nuts or other parts of plants not elsewhere specified.		

When CENVAT facility has not been availed:-

20.15	(a) Packed in OTS Cans	Rs. 12.50 (Rs. twelve and paise fifty only) per kg. of the net weight of empty containers.	12.00	0.50
20.16	(b) Packed in Aseptic Bag kept in M.S. drums.	Re.0.90 (paise ninety only) per kg. of the net content	0.40	0.50
20.17	(c) Packed in Glass Bottles	Re.0.80 (paise eighty only) per kg. of net content.	All. C. Excise	

When CENVAT facility has been availed:-

20.18	(a) Packed in OTS Cans	Rs. 12.00 (Rs. twelve only) per kg. of the net weight of empty containers	All Customs	
20.19	(b) Packed in Aseptic Bag kept in M.S. drums.	Re. 0.40 (Paise forty only) per kg. of the net content.	All Customs	

CHAPTER - 21 Miscellaneous Edible Preparations

21.01 Chutneys and condiment
to pastes all sorts. and
21.06 Miscellaneous Edible
preparation all sorts.

When CENVAT facility has not been availed :-

21.01	(a) Packed in OTS Cans	Rs. 12.50 (Rs. twelve and paise fifty only) per kg. of the net weight of empty containers.	12.00	0.50
21.02	(b) Packed in Aseptic Bag kept in M.S. drums.	Re. 0.90 (Paise ninety only) per kg. of the net content.	0.40	0.50
21.03	(c) Packed in Glass Bottles.	Re.0.80 (Paise eighty only) per kg. of the net content.	All C. Excise	

When CENVAT facility has been availed:-

21.04	(a) Packed in OTS Cans	Rs. 12.00 (RS. twelve only) per kg. of the net weight of empty containers.	All Customs	
21.05	(b) Packed in Aseptic Bag kept in M.S. drums	Re.0.40 (Paise forty only) per kg. of the net content.	All Customs	

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 29th May, 2000

GSR 501(E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), number GSR 120 (E) dated the 17th February, 1999 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) dated the 17th February, 1999 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of a period of one hundred twenty days from the date on which copies of the Gazette of India in which the said notification was published were made available to the public:

And whereas the copies of the said Gazette of India were made available to the public on 18th February, 1999;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely:-

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (2nd Amendment) Rules, 2000
- (2) They shall come into force on the date of their publication in the Official Gazette
2. In the Prevention of Food Adulteration Rules, 1955-
 - (1) in rule 25 for the word figure brackets and letter "Rule 32 (c)" the word figure brackets and letter " Rule 32 (b)" shall be substituted;
 - (2) in Appendix "B", -
 - (a) in item A 11.02.11, A.11.02.13 and A.11.02.13.01, the following shall be respectively added at the end namely :-
 "The total acidity expressed as lactic acid shall not be more than 0.35 percent".
 - (b) in item A.11.02.14,-
 - (i) for the words, "MILK POWDER means the product obtained from cow or buffalo milk or a combination thereof or from standardized milk, by the removal of water." the following shall be substituted, namely:-
 "MILK POWDER means the product prepared by spray drying of standardised milk obtained from fresh cow milk or buffalo milk or a mixture thereof".
 - (ii) for the portion beginning with the words, 'Milk powder shall contain not more than 5.0 percent moisture and ending with the words. "The process of drying shall be mentioned on the label" the following shall be substituted. namely :-

"Milk powder shall contain not more than 4.0 percent moisture, not less than 26.0 percent milk fat, not less than 96.0 percent total solids and not more than 7.3 percent total ash on dry basis. The total acidity expressed as lactic acid shall not be more than 1.2 percent. The plate count shall not exceed 40.00 per gram. Coliform count and coagulase positive staphylococcus aureus shall be absent in 0.1 gram of the powder. Salmonella and shigella shall be absent in 25 grams of the powder. The insolubility index shall not be more than 2.0 ml."

- (c) in item A.11.02.15 for the words, brackets and figures, "The solubility percent of the product shall be as follows:-

Solubility percent (Minimum)	Roller dried	Spray dreid
	85.0	98.5"

the following words, brackets, figures and letters shall be substituted, namely:-

"Insolubility Index (Maximum)	Roller dried	Spray dried
	15.0 ml	1.5 ml.

The total solids shall not be less than 95.0 percent and total ash (on dry basis) shall not be more than 8.2 percent;"

- (d) in item A.11.02.16 for the words brackets and figures, "The minimum solubility of the product shall conform to the following standards:

Solubility percent (Minimum)	Roller dried	Spray dried
	85.0 ml.	98.5"

the following words, brackets, figures and letters shall be substituted, namely:-

"Insolubility Index (Maximum)	Roller dried	Spray dried.
	15.0 ml.	1.5 ml.

The total solids shall not be less than 95.0 percent and total ash (on dry basis) shall not be more than 8.2 percent. The acidity expressed as lactic acid shall not be more than 1.5 percent."

[F.No. P. 15014/1/98-PH (Food)]

DEEPAK GUPTA, Jt. Secy.

Foot Note: The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide SRO 2105 dated 12-9-1955 and werre last amended vide GSR No. 463(E), dated 17-5-2000.



MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

New Delhi, the 13th June, 2000

GSR 537(E) - Whereas the draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954

(37 of 1954) in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) number GSR 770 (E) dated the 15th November, 1999 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 15th November, 1999 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of period of thirty days from the date on which copies of the Gazette of India in which the said draft rules were published were made available to the public;

And whereas the copies of the said Gazette of India were made available to the Public on 16th November, 1999;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (___3rd___Amendment) Rules, 2000.
(2) They shall come into force on 1st September, 2000.
2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the said rules), for rule 24, the following rule shall be substituted, namely :-

"24. Extraneous addition of colouring matter to be mentioned on the label :- Where an extraneous colouring matter has been added to any article of food, there shall be displayed one of the following statements in capital letters, just beneath the list of ingredients on the label attached to any package of food so coloured, namely

(i) CONTAINS PERMITTED NATURAL COLOUR(S)

OR

(ii) CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S)

OR

(iii) CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S)

OR

(iv) CONTAINS PERMITTED NATURAL */AND* SYNTHETIC* COLOUR(S)

(For the period upto and inclusive of 1st September, 2001)

(* Strike out whichever is not applicable)

Note:-Provided that where such a statement is displayed, the colour used in the product need not to be mentioned in the list of ingredients".

3. In rule 32 of the said rules -

(a) after second proviso to clause (b), the following provisos shall be inserted, namely:-

"Provided further that when statement regarding addition of colours or flavours is displayed on the label in accordance with rule 24 and rule 64BB respectively, addition of such colours or flavours need not be mentioned in the list of ingredients:

Provided also that in case both colour and flavour are used in the product, one of the following combined statements in capital letters shall be displayed, just beneath the list of ingredients on the label attached to any package of food so coloured and flavoured, namely :-

(i) CONTAINS PERMITTED NATURAL COLOUR(S) AND ADDED FLAVOUR(S)

OR

(ii) CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

OR

(iii) CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

OR

(iv) CONTAINS PERMITTED NATURAL */AND* SYNTHETIC* COLOURS AND ADDED FLAVOURS'
(For the period ;upto and inclusive of 1st September, 2001)

(*Strike out whichever is not applicable)

(b) in clause (f), for the fifth proviso, the following provisos, shall be substituted, namely :-

"Provided also that in case of any package containing bread or liquid milk, sterilized or Ultra High Temperature treated milk, soya milk, flavoured milk, any package containing dhokla, bhelpuri, pizza, doughnuts, khoa, paneer or any uncanned package of fruits, vegetables, meat, fish or any other like commodity which has a short shelf life the date, month and year in which the commodity is manufactured or prepared or prepacked shall be mentioned, on the label:

Provided also that in case of package containing confectionery weighing 20g or less, the particulars under this clause need not be specified.",

(c) after clause(h), and before Explanation I, the following clause shall be inserted, namely :-

(i) the month and year in capital letters upto which the product is ;best for consumption, in the following manner, namely :-

"BEST BEFOREMONTHS AND YEAR

OR

"BEST BEFORE.....MONTHS FROM PACKAGING

OR

"BEST BEFORE.....MONTHS FROM MANUFACTURE

OR

"BEST BEFORE UPTO MONTH AND YEAR.....

}[For the period

OR

}upto and

"BEST BEFORE WITHIN.....MONTHS

}inclusive of

FROM THE DATE OF PACKAGING/MANUFACTURE

}1st September 2001.]

Note :-Blank be filled up)

Provided that in case of wholesale packages the particulars under clauses (b), (f), (g), (h) and this clause need not be specified :

Provided further that in case of package or bottle containing sterilised or Ultra High Temperature ;treated milk, soya milk, flavoured milk, any package containing bread, dhokla, bhelpuri, pizza, doughnuts, khoa, paneer, or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows:-

"BEST BEFORE.....DATE/MONTH/YEAR"

"BEST BEFORE.....DATE/MONTH/YEAR"

OR

"BEST BEFORE.....DAYS FROM PACKAGING"

OR

"BEST BEFORE.....DAYS FROM MANUFACTURE"

OR

"BEST BEFORE UPTO.....DATE/MONTH/YEAR } [For the period upto

OR

} and inclusive of Ist

"BEST BEFORE WITHIN.....DAYS FROM THE } September 2001

DATE OF PACKAGING/MANUFACTURE"

- Note :
- (i) blank be filled up
 - (ii) Month and year may ;be used in numerals.
 - (iii) Year may be given in two digits.

Provided also that in case of a package containing confectionery ;weighing 20g or less, the particulars under clause (i) may not be specified :

Provided also that the above declaration of best before consumption shall not be applicable to the Packages of Aspartame and Infant milk substitute and Infant food".

(d) In Explanation VI, for clause (a), the following clause shall be substituted, namely:-

"(a) a number of retail package, where such first mentioned package is intended for sale, distribution of delivery to an intermediary and is not intended for sale direct to a single consumer; or"

[F.No. P-15019/17/98-PH (Food) Vol. III]

Deepak Gupta, Jt. Secy.

Foot Note: The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide SRO 2105 dated 12-9-1955 and were last amended vide GSR No. 463 (E) dated 17-5-2000.

FAIRS & SEMINARS

Short term training programme at CFTRI, Mysore from 4-15 Sept, 2000 and 18-29 Sept, 2000

The short term course entitled "Newer trends in postharvest handling of fruits & vegetables : A paradigm scope" and appropriate technologies of fruit & vegetable products from farm to consumer chain" is being organised at CFTRI Mysore.

For more information, Contact:

Head/HRD/

Tel : 0821-514760,

Fax : 516308/517233,

E-mail : hrd@cscftri.res.nic

or

stcatt@yahoo.com



"CFTRI" : Golden Jubilee Science and Industry Meet-2000".

The Central Food Technology Research Institute, Mysore is celebrating its Golden Jubilee Year and a number of events are planned on this happy occasion to commemorate 50 years of service to the Nation in Food Science and Food Technology.

One of the events scheduled on July 25-27, 2000. This event will have five scientific sessions on topics such as - Overview of Status of Food Science and Technology, a

revisit to Indian Food Laws-vis-à-vis would trade regime, promotion of food processing industries, the future scenario of food processing, in addition to Business Meet, visit to CFTRI Departments, Technology Demonstration and posters' presentations of current CFTRI activities.

On this occasion CFTRI is planning to bring out a "CFTRI GOLDEN JUBILEE HANDBOOK" with advertisements from all sectors dealing with food processing. The advertisement tariff are :

1. Out side back cover page (4 colour) Rs. 30,000
2. Inside front and back cover pages (4 colour) 20,000 (each)
3. Inner full page (4 colour) Rs. 15,000
4. Inner full page (black and white) Rs. 10,000

For further details & information please contact Mr. S. P. Pillai, Head Technology Transfer & Business Development, CFTRI, Mysore - 570013 Tel : 0821 - 514534, Telfax : 0821 - 515453, E-mail : ttm@cscftri.res.nic.in



Cornell-in-India, Biotechnology Initiative, Biotechnology for Development September 12-15, 2000, Hotel Taj Connemara at

Chennai.

Cornell University is being organized 4 days programmes in the lie of science opportunities titled "Biotechnology for Development September 12-15, 2000, Hotel Taj Connemara at Chennai.

The programme will be of immense use to the senior & middle management personnel of corporate entities engaged in agri, pharma, food and animal health care, public and privately funded Indian research bodies etc.

For more information please contact Mr. K. Vijayaraghavan, Sathguru Management Consultants Pvt. Ltd., 15, Hindi Nagar, Punjagutta, Hyderabad 500 034, Tel-fax 0091-40335 0586, 3356507, 3354042, 335 4345. E-mail : sathguru@hdl.vsnl.net.in



69th Izmir International Fair, Izmir (Turkey) August 26 the September 3, 2000.

India Trade Promotion Organisation (ITPO) is organizing national level participation of Indian Trade and Industry in 69th edition of Izmir International Fair.

The Izmir fair is a premier commercial event in Turkey and Izmir is the second largest port where cargo imports from India take place. It is also at the heart

of the most dynamic commercial area of Aegean and Western Turkey. Interested parties / persons / companies may kindly contact M.r. M. Tandan General Manager, TPO, Pragati Bhawan, Pragati Maidan, New Delhi - 110 001. Tel : 331 95543, Telefax : 031-61311/1022/, Fax : 91-11-331 8142, 896-3371886, E-mail : po@giasd101.vsnl.net.in



BA - 2000, 29.09.2000 - 5.10.200, Munich, Germany

BA'2000 the world's No. 1 trade fair for the baking and confectionery sector will be held from 29th September to 5th October, 2000 at the world's most modern trade fair center-Munich Germany

Golden Wings, the tour division of Delhi based company company associated forex service Ltd. Interested parties/persons/Cos. may kindly contact Ms. Ritu, Golden Wings 2E/25 Jhandelwala Extension, New Delhi - Tel - 011-254924, 3539265/66 Fax : 011-254596/35130691.



and International Dairy & Food Technology Expo 2000

October 3-6, 2000

and International Dairy & Food Technology Expo 2000 and Technical Seminars are being organised during October 3-6, 2000 at Pragati Maidan, New Delhi.

The Event will be a unique forum for technology transfer, striking

collaboration deals, boosting trade and identifying potential investors and business associates and also for dissemination of information to - Industry leaders, decision makers, Scientists, Students, farmers, etc.

Extensive visitor promotion & publicity campaign for attracting business visits expected. Business Delegations, country level trade Delegations etc. A high power Government Delegation of the Federal Republic of Germany led by the Federal Secretary will be visiting the Expo and organise a "Cooperation Exchange" with the Indian companies in the Expo.

Technical Seminars on vital issues facing the Food Processing & Dairy industries are being organised alongside the Expo. The Expo will also have the visit of farmers, scientists, research workers, students and decision makers in the Dairy and Food Processing Industries. The Seminar will focus attention on issues like milk production, processing and packaging, automation solutions for updating manufacturing technologies, new concepts of marketing, growth & diversification of the food processing industry, global competition and export promotion, wastage control, investment, requirements, etc.

The Expo will focus attention, on modernisation new technologies and business opportunities in breeding, feeding, health care, processing, marketing R&D in the Dairy industry and the state-of-the-art technologies for food processing industries. The OPERATION FLOOD in India has shown remarkable achievements in planned milk production,

processing and marketing of milk products through cooperative sector. India can now offer latest technology and know-how in this sector to the other developing countries.

The IDFT Expo 2000 is organised by TAFCON Projects India Pvt. Ltd., New Delhi a professional international known Trade Fair organiser, in association with ISC KolnMesse, Koln, Germany.



International Food & Hospitality Show-2000, 12-15 October, 2000, Bangkok.

The Bangkok Exhibition Services Ltd. (B.E.S.) is organizing the International Food & Hospitality show-2000 (IFHS 2000) the 8th International Hotel, Catering, Bakery, Food Beverage and Rethil Supplies Exhibition to be held on 12-15 October 2000 at Queen Sirikit National Convention Centre, Bangkok.

Interested parties/persons/Cos. May kindly contact Bangkok Exhibition Services Ltd., 62, Rama VI Soi 30, Rama VI Road, Samsennai, Phayathai, Bangkok 10400 Thailand Tel : +66(02) 617 1475, Fax : +66(02) 2713223, 6171406, Contact Person : Ms. Pongthong Charoenpairong.

Vietnam International Industrial Fair-2000 19th-25th October'2000 Hanoi.

The above fair will be held at Hanoi and the once again a million dollar millennium opportunity presents itself to Indian exporters to increase their foreign exchange earning potential.

It will focus specifically on Industrial segments devoted to developing core and manufacturing sectors of the economy. The profile of this exhibition; Food Processing Equipment & Products, Industrial Machinery etc.

Interested parties/persons/cos. May contact Swarna Kaji, Head-International Trade Fairs, Orbit, 202, Navyug, Industrial Estate, T.J. Road, Sewri, Mumbai - 400015, Tel : 410 2801/02/03 Fax : 022 410 2805, E-mail orbitec@orbit-world.com.



Agri Fare - 2000, 12 to 15 October, 2000, Sanskar Kendra, Ahmedabad, Gujarat.

International Investment Meet Exhibition and Conference on Agro & Food Processing Industry will be held from 12 to 15 October, 2000 at Gujarat. It is an important effortsw of the CII, supported by Ministry of Food Processing Industries, Govt. of India, department of Agriculture and Co-operation, Govt. of Gujarat, Agro Industries Corporation Ltd., APEDA, National Horticulture Board (NHB) and NABARD.

Interested parties/persons/Cos.,

may contact Gauri Kumar, Chairperson CII Gujarat Task Force Agro & Food Processing, Confederation of Indian Industry, 203-204, Sears Tower, Gulabi Tekra, Near Panchvati, Ahmedabad 380006. Tel +91+79+6468872, 6469346, 6469843, Fax : 91+79 6462878 E-mail ciiguj@adlvsnl.in, Website: www.indianindustry.com; www.ciionline.org.



SIAL Food Fair, Paris (France) 22-26, October, 2000

SIAL is the largest International Food Products Exhibition will be held in Paris (France) from 22nd to 26th October, 2000. It is being co-ordinated by the department of food processing Industries alongwith India Trade Promotion Organisation (ITPO) and Agricultural Processed Food Export Development Authority (APEDA).

Interested parties/persons/Cos., may contact Mr. B. M. Tondan, General Manager, India Trade Promotion Organisation ITPO, Pragati Bhawan, Pragati Maidan, New Delhi - 110001 Tel : - 3319564, Fax : 3371866



RITE-2001, 28-30 March SICEC.

The first comprehensive B2B retail Industry event in the Asia Pacific is organizing RITE-2001 The retail Industry trade event from 28-30 March 2001 at the Singapore International Convention and Exhibition Centre (SICEC).

IECEC has also invited ALL INDIA FOOD PROCESSOR ASSOCIATION to take part in the RITE 2001

Rite 2001 Is launched to ensure that suppliers reap the maximum benefit of their marketing dollars. Comprising of three shows FMCC 2001, Shop Fit 2001 and Retail IT2001, this event is said to be an all encompassing B2B (business-to-business) platform for the retail industry in the Asia Pacific.

Members of AIFPA/Other aspirant Parties/Persons/Co. who wish to take part in this event may contact Mr. Jackson Yeoh, Project Manager for RITE 2001 Singapore Exhibition Services Pvt. Ltd. 47 Scotts Road, 11th Floor, Goldbell Towers, Singapore - 228233. Tel : (65) 7386776 Fax : (65) 7326776 E-mail : info@sesmontnet.com Website : www.rite-exhibition.com



NEWS

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RESEARCH ARTICLES

PROTEIN ENRICHMENT OF MANGO PEEL THROUGH SOLID STATE FERMENTATION USING *ASPERGILLUS NIGER* FOR UTILISATION AS FEED

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ABSTRACT

Mango peel, a mango processing waste, was protein enriched by *Aspergillus niger* in a solid state fermentation process. Two to three fold increase in crude and true protein values were observed when sterilized peel was fermented. Supplementation of sterilized peel with essential nutrients enhanced the protein values by over five times as compared to that of unfermented peel.

INTRODUCTION

Mango is the annual crop of India with production of about 10 million metric tonnes (FAO, 1992). During processing of ripe mangoes, 35-55% of total waste is generated of which peel constitutes upto 20 percent depending upon the variety (Tandon et al., 1995). Some times the peel is fed to the cattle but generally it is thrown away as waste which may add to the environmental pollution. Mango peel, despite being a rich source of carbohydrates and some other components, is not a balanced animal feed because of its low protein value (Garg et al., 1994). Microbial fermentations are being used for the production of protein enriched animal feed from high carbohydrate raw materials (Hang, 1988). Recently, filamentous fungi have been used increasingly for production of single cell protein

because of their fast growing nature and versatile enzyme production capabilities (Rhodes and Broderick, 1989; Vaccarino et al., 1989; Shigeru et al., 1994). *Aspergillus niger* is a fungus of choice because of its efficient hydrolytic enzyme system (Menezes et al., 1989). In the present investigation nutritional status of mango peel was improved by solid state fermentation using *A.niger*.

MATERIALS AND METHODS

Organism: *A.niger* NRRL 2270, obtained from Department of Food Science and Technology, NYSAES, NY, USA was used for the production of single cell protein. The culture was maintained on Potato Dextrose Agar slants.

Substrate: Mango peel cv. *Dashehari*, obtained from the processing laboratory of our Institute, was kept under frozen conditions until

used. The thawed mango peel was homogenized in a blender with equal amount of water or nutrient solution. The nutrient solution had the following composition %: NH_4NO_3 , 6.0; KH_2PO_4 , 0.4 and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 0.4. The pH of the peel was adjusted to 4.3 with 0.1 N HCl.

Treatments: Following treatments were given to the mango peel :

C	Control
T1	Unsterilized, without nutrient addition
T2	Sterilized, without nutrient addition
T3	Unsterilized, nutrient added
T4	Sterilized, nutrient added

Solid state fermentation: Samples of 10 g each of homogenized peel were taken in 1000 ml beakers in uniform 3 cm layer and covered with a double layer aluminium foil. One set of five replicates was sterilized while, the other identical set was kept unsterilized. The substrate was inoculated with 1ml suspension of 0.1% peptone water containing 7 days old spores of *A.niger* (about 10^6 /ml). The beakers were incubated at 30°C for five days and after that samples were dried and ground for analysis.

Analyses : Moisture and total and reducing sugars were estimated by the method adopted from Kalra et al. (1981). Pectin and fibre contents were determined as per the method of Tandon et al. (1995). True and crude protein contents were determined by Folin - Phenol method and Microkjeldahl procedure, respectively. (Herbert et al., 1971). Tannins and acidity were determined as per method of Ranganna (1986). All the analyses were carried out in triplicate.

RESULTS AND DISCUSSION

Mango peel is a rich source of sugars, pectin and fibre but is deficient in protein value (Table 1). Hence, mango peel was treated with *A.niger* having good cellulolytic and pectinolytic activities for protein enrichment. After five days of solid state fermentation of mango peel, the crude and true protein values of the must were determined and have been depicted in Figs 1A and 1B, respectively. The fermentation of unsterilized peel without nutrient addition (T_1) increased the crude

protein from 3.9 to 6.9 and true protein contents from 2.0 to 5.2 percent. However, sterilization of peel (T_2) further improved both the protein fractions. Amelioration of unsterilized peel with nutrients (T_3) gave a better response as compared to T_2 as the protein value almost doubled. It indicated that supplementation of nutrient to mango peel accelerated the microbial growth. Still higher protein values were obtained when the nutrient added peel was sterilized (T_4) and pushing up the true protein to 11.3 and crude protein to 20.3 percent, which were more than five times than that of control. Higher protein values obtained in T_4 treatment might be due to the break down or loosening of substrate during sterilization coupled with nutrient addition which stimulated the fungal growth. The tannin contents of protein enriched peel (T_4) was reduced to 2.5% compared to control peel where it was as high as 8.4%, which makes it better suited for animal feed purpose. Moreover, this protein enriched peel will be used as protein supplement to animal feed and hence will be diluted considerably and the final tannin content will further go down. The acidity of the peel increased from 0.5 to 1.9% which again will be diluted when this protein enriched peel will be mixed in animal feed.

Protein enrichment of fruit wastes such as citrus peel and apple pomace have achieved similar improvement in protein values from 8.0 to 24% and 6.0 to 15% respectively (Menezes et al., 1989;

Hang, 1988). Hang, (1988). Hang (1988) reported that the nutritional value of protein-enriched apple pomace apparently depended upon the amount of ammonium sulphate added in the medium. Raimbault and Alazard (1980) recorded a five fold increase in the protein content of cassava meal that had been supplemented with ammonium sulphate or urea. Our results also indicated that nutrient addition is more critical for protein improvement of mango peel. Sterilization of nutrient added peel further improved the protein value. So, to ensure better growth rate of fungus, sterilization along with nutrient addition is suggested.

The results obtained in the present study would be useful in upgrading the nutritional status of mango peel for its use as animal feed. This would also help the mango processors to manage their solid waste efficiently and minimize the environmental pollution problem besides some addition to their profit.

ACKNOWLEDGMENT

Authors are thankful to the Director, CISH, Lucknow, for providing the necessary facilities.

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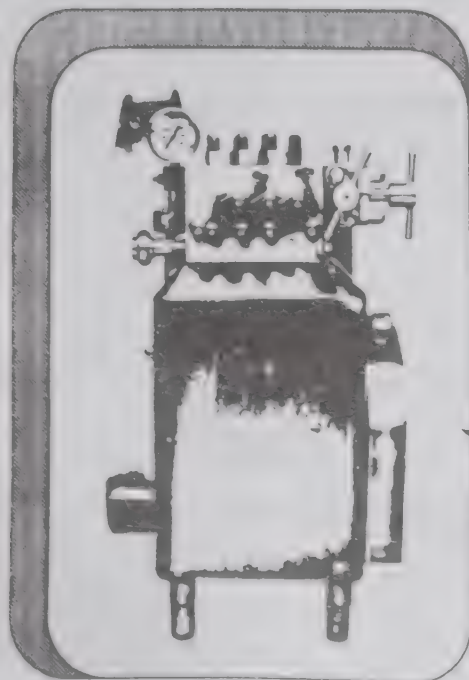
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Table 1. Approximate Composition of Mango peel

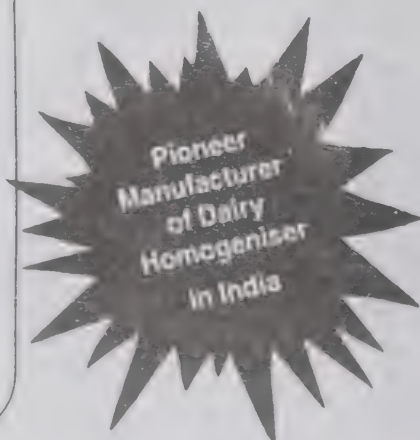
Constituents	% (dry wt. basis)
Moisture*	68.5*
Total Sugars	48.1
Reducing sugars	40.8
Pectin	12.9
Extractable fibre	8.0
Crude protein	3.9
Tannins	8.4
Acidity	0.5

* Fresh wt basis

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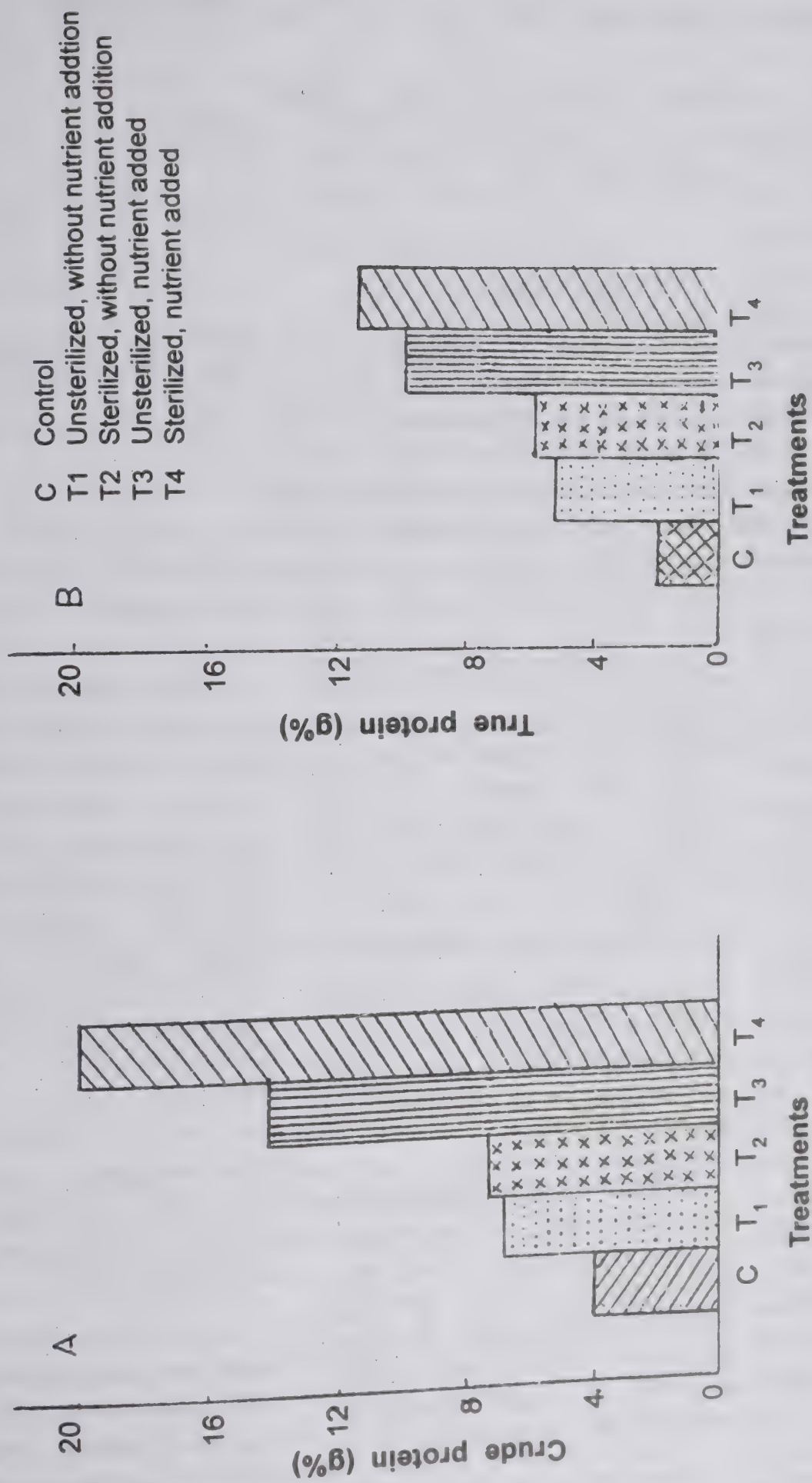
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Figs : 1A and 1B - Protein enrichment of mango peel through solid state fermentation using *A. niger*.

STUDIES ON OSMOTIC DEHYDRATION OF SOME VARIETIES OF RIPE MANGOES GROWN IN UTTAR PRADESH

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ABSTRACT

The effect of osmotic dehydration technique on four mango varieties viz. *Chausa*, *Dashehari*, *Langra* and *Fazari*, keeping the concentration, volume and temperature of sugar syrup constant was evaluated. The only variable maintained was the percentage of added citric acid. Mango slices of *Dashehari* cultivar steeped for 18 hours in 70° Brix sugar syrup containing 0.5 percent citric acid, on drying were adjudged the best, having non-significant difference with *Chausa*, but significant differences existed with *Fazari* and *Langra* cultivars. The Storage studies showed that keeping the osmotic dehydrated mango slices above 64.8 and below 75.5 % R.H. would be conducive to the retention of colour, flavour and taste and texture of the product.

INTRODUCTION

Osmotic dehydration is a novel approach of dehydration which involves two stages. The 1st stage is removal of water (33 to 45%) using concentrated sugar syrup as osmotic agent. The 2nd stage is further dehydration in an air circulation drier where moisture content is further reduced to about 15 percent. In this technique drying period is cut down to a large extent so that heat damage to colour and flavour is minimized. Work has been reported on osmotic dehydration of some varieties of South Indian mangoes by Nanjundaswamy et al (1976). Effect of steeping in various concentrations of sugar before drying on *Dashehari* cultivar of Uttar Pradesh has been studied by Teotia et al (1976). The present work was undertaken to evaluate the effect of osmotic dehydration

on some varieties grown in Uttar Pradesh, keeping the concentration, volume and temperature of the sugar syrup constant. The only variable maintained was the percentage of added citric acid in the syrup.

MATERIALS AND METHODS

Mangoes of cultivar *Chausa*, *Dashehari*, *Langra* and *Fazari* were purchased from local market and were studied for their physical and chemical characters.

Just ripe fruits of uniform size and firm texture were sorted out for the experiment. They were washed, peeled, cut into slices and recovery percentage noted. The slices of various cultivars were steeped separately in sugar solutions of following two compositions :-

1. Sugar syrup of 70°Brix only.
2. Sugar syrup of 70°Brix containing 0.5% citric acid.

Fruit to steep solution ratio was kept 1:1 and steeping was done for 18 hours initially at 80°C and mixture was allowed to cool to room temperature and then 0.2 percent potassium metabisulphite was added. The slices were then drained thoroughly over stainless wire mesh sieve and the drained slices put in a cross flow cabinet drier at 60°C for 4 to 7 hours depending on the cultivars. The periodic moisture loss in drying was noted. The dehydrated slices were placed inside friction top tin containers and stored at room temperature.

Cut out examination of the sample was done immediately after dehydration and again after 6 months of storage. Percentage of peel, slices and stone was calculated in each case. Total soluble solids were determined by hand refractometer after pulping the fruit

and squeezing out the juice through muslin cloth. Moisture percentage was determined by drying the pulp to a constant weight in an electric oven at 60°C. Titrable acidity, sugars and free sulphur-di-oxide was estimated by A.O.A.C. (1960) methods. Equilibrium Relative Humidity (E.R.H.) of intermediate mango slices was calculated by Wink's (1946) Weight Equilibrium Method. Organoleptic evaluation was done by a panel of 7 members of Institute following hedonic scale.

RESULTS AND DISCUSSION

Fresh Fruits

Recovery percentage of peel, slices and stone are given in table I. Peel and stone percentage was found to be lowest in *Fazari* cultivars. *Chausa* cultivar was found to contain highest stone percentage while *Dashehari* topped in peel recovery.

Chemical composition of the fruit is given in Table-II. T.S.S. of the different cultivars ranged in between 18 to 24 while acidity and total sugars in between 0.12 to 0.25 and 16.25 to 22.45 percent respectively.

Steeped Mango Slices

Changes in syrup volume, T.S.S. and weight of mango slices on steeping in 70°Brix sugar syrup are given in Table-III. The fall in T.S.S. was noticed almost similar in all the cultivars ranging between 54 to 55°Brix. Weight reduction of slices was found to be highest in *Dashehari* cultivar (42.24%) while lowest in *Langra* cultivar (30.13%)

which was in conformity findings of Mehta et.al (1982) and Tomar et. al (1990) who recorded 37.9% and 40.0% decline in case of pineapple and pear respectively. Weight reduction was reported higher by Bongirwar and Sreenivasan (1977) in osmotic dehydration of Banana by using steeping solution in higher ratio.

Dehydrated Mango Slices

After osmosis the mango slices were drained and put for dehydration. Table-IV shows the periodic loss of moisture on drying of the different cultivars. Slices of *Dashehari* and *Langra* took 4.30 to 5.30 hours respectively while *Chausa* and *Fazari* each took 6 hours. Reduction in weight was noted little higher in citric acid added samples in all the cultivars.

Moisture was recorded varying from 12.0 to 14.45 percent in different cultivars just after dehydration. As the slices lost moisture in air drying, the various constituents were found enhanced in comparison to fresh slices. Acidity was noted between 1.37 to 1.42 percent in citric acid added samples in comparison to 0.39 to 0.42 percent in the samples where citric acid was not added in the steeping solution. Osmotic dehydrated mango slices of different cultivars when analysed after 6 months of storage period (Table-V) showed an increasing trend in moisture and reducing sugars. No significant changes were observed in total sugars. The sulphur-di-oxide content showed a periodic decline on storage which is in

conformity with Bloch (1963) and McBean et al (1971).

Organoleptic Evaluation

Osmotically dehydrated mango slices of *Dashehari* cultivar with citric acid were adjudged the best on organoleptic evaluation obtaining 84.03% marks (Table-VI). The slices were found significantly superior in colour, flavour, texture and taste over the slices of all the cultivars in which citric acid was not added and even the slices of *Langra* cultivar in which citric acid was added. However, insignificant differences existed between the citric acid added samples of *Dashehari* and *Chausa* cultivars which was graded IInd with 81.28% marks. Slices of *Dashehari* cultivar with no citric acid, were even more liked organoleptically than acid added slices of *Langra* and *Fazari* cultivars. As far as overall grading was concerned the citric acid added samples of *Fazari* and *Langra* cultivars were graded III and IV respectively.

Packaging and Storage Studies

The citric acid added mango slices of *Dashehari* cultivars were put to E.R.H. studies. The initial moisture content of the osmotically dehydrated mango slices was 12.12%. The nature of equilibrium absorption isotherm was sigmoidal type (Fig.1), which is in conformity with the observations of Deshpande and Tamhane (1981). From the storage data in Table-VII, it is evident that higher humidities stimulated moisture pick-up; thus mango slices stored at 100%,

86.5% and 75.5% RH turned mouldy after one week, two weeks and four weeks respectively. Simultaneously, storage at lower humidities was also observed to be detrimental to the quality of the product. The storage studies thus indicated that keeping the product below 75.5% and above 64.8% R.H. will be conducive to the retention of colour, flavour and texture of the product.

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Table I. Recovery of Peel, Slices and Stone of different Cultivars

Characters	Name of Cultivars			
	<i>Chausa</i>	<i>Dashehari</i>	<i>Langra</i>	<i>Fazari</i>
Wt. of Fruit (Kg)	2.457	1.720	2.00	2.050
Wt. of Peel (Kg)	0.407	0.380	0.344	0.223
Peel (%)	16.75	22.11	17.10	10.81
Wt. of Slice (Kg)	1.296	0.925	1.175	1.342
Slice (%)	53.31	53.61	58.75	65.51
Wt. of Stone (Kg)	0.755	0.415	0.481	0.485
Stone (%)	30.72	24.12	24.03	23.65

Table II. Chemical composition of fresh fruit of different varieties

Characters	Name of Variety			
	<i>Chausa</i>	<i>Dashehari</i>	<i>Langra</i>	<i>Fazari</i>
Moisture %	74.8	80.92	75.92	81.22
T.S.S. (°B)	24	21	23	18
pH	6.5	6.5	6.0	6.5
Acidity (%)	0.16	0.16	0.12	0.25
Reducing Sugars (%)	3.45	3.12	3.11	3.74
Total Sugars (%)	22.45	17.85	20.65	16.25

Table III. Changes in Syrup Volume, T.S.S. and Weight of Slices of different cultivars during osmosis

Characters Treatment	T.S.S. of Syrup used (°B)	Wt of Slices Steeped (g)	Vol. of Syrup used (ml)	Wt of Slices after 24 hours (g)	Weight reduction in slices (%)	T.S.S. of syrup after steeping (°B)	Vol. of syrup after steeping (ml)
<i>Chausa</i> WOCA	70	645.0	650	430	33.33	35	750
<i>Chausa</i> WCA	70	645.0	650	425	34.10	55	750
<i>Dashehari</i> WOCA	70	467.5	470	270	42.24	54	625
<i>Dashehari</i> WCA	70	467.5	470	275	41.17	54	600
<i>Langra</i> WOCA	70	587.0	590	400	31.85	54	725
<i>Langra</i> WCA	70	587.0	590	410	30.15	55	740
<i>Fazari</i> WOCA	70	650.0	650	447	31.23	55	750
<i>Fazari</i> WCA	70	650.0	650	445	31.54	54	750

WOCA = Without citric acid

WCA = With citric acid

Table IV. Periodic Weight Loss in different varieties of Mango Slices during Drying

Time of hours	Name of Varieties							
	<i>Chausa</i>		<i>Dashehari</i>		<i>Langra</i>		<i>Fazari</i>	
	WOCA	WCA	WOCA	WCA	WOCA	WCA	WOCA	WCA
Initial Wt. of Slice (g)	400	400	250	250	385	385	425	425
Wt.after 1 hours (g)	350	320	187	206	320	302	372	387
Wt.after 2 hours (g)	326	299	167	188	282	263	322	342
Wt.after 3 hours (g)	298	270	153	162	248	231	281	310
Wt.after 4 hours (g)	270	251	139	135	229	215	252	285
Wt.after 5 hours (g)	242	221	-	-	210	197	228	253
Wt.after 6 hours (g)	227	209	-	-	-	-	208	210
Wt.retention after drying (%)	56.75	52.25	50.40	49.60	51.94	48.0	49.0	49.41
Wt. reduction in drying (%)	43.25	47.75	49.60	50.40	48.06	52.0	51.0	50.59

WOCA = Without citric acid

WCA = With citric acid

Table V. Chemical Constituents of Mango Slices just after Dehydration and after 6 Months of Storage on Dry Weight Basis

Name of Variety	Moisture (%)		Acidity (%)		Red.Sugars (%)		Total Sugars (%)		SO ₂ (ppm)	
Character	A	B	A	B	A	B	A	B	A	B
<i>Chausa</i> WOCA	11.00	11.65	0.49	0.36	35.15	34.98	68.72	67.58	585	330
<i>Chausa</i> WCA	11.74	11.82	1.42	1.34	35.89	36.70	69.91	69.58	580	348
<i>Dashehari</i> WOCA	12.90	13.25	0.42	0.35	35.57	36.82	67.74	67.30	590	330
<i>Dashehari</i> WCA	14.14	14.29	1.40	1.25	38.64	38.74	71.26	65.52	590	360
<i>Langra</i> WOCA	11.31	11.82	0.41	0.38	35.14	35.22	68.45	68.48	450	265
<i>Langra</i> WCA	11.24	11.65	1.37	1.27	37.00	37.48	70.00	69.25	450	280
<i>Fazari</i> WOCA	14.45	13.85	0.39	0.31	34.94	35.54	68.49	68.07	500	339
<i>Fazari</i> WCA	13.99	13.75	1.42	1.38	35.78	36.21	69.84	69.82	545	310

WOCA = Without citric acid

A - Just after Dehydration

WCA = With citric acid

B - After six months of storage

Table VI. Mean Score of different cultivars of Osmotically dehydrated Mango Slices

Character	Chausa		Dashehari		Langra		Fazari		S.E.	C.D.at 5%
	WOCA	WCA	WOCA	WCA	WOCA	WCA	WOCA	WCA		
Colour	18.46	19.74	19.45	20.67	16.47	18.41	17.24	19.27	± 1.21	2.42
Flavour	16.17	20.86	19.12	21.95	16.74	17.14	16.76	18.17	± 1.37	2.61
Texture	18.73	19.64	18.74	20.79	15.94	16.27	18.41	17.37	± 1.51	3.02
Taste	17.61	21.04	17.14	21.12	14.61	16.79	15.36	19.04	± 1.98	3.76
Total	70.97	81.28	74.45	84.03	63.76	68.61	67.77	72.85		

WOCA = Without citric acid

WCA = With citric acid

S.E. - Standard Error

C.D. - Critical Difference

Table VII. Equilibrium Relative Humidity of Osmotically Dehydrated Mango Slices of Dashehari Cultivar at R.T. (30-32°C)

E.M.C.(%)	R.H.(%)	Number of days required to reach Equilibrium	Remarks
1.01	11.1	31	Glossyness reduced, texture impaired
1.47	22.9	31	----- do -----
2.34	32.9	2x9	----- do -----
3.40	43.9	27	Glossyness reduced, texture good
3.91	53.5	27	----- do -----
9.75	64.8	27	Original texture & Glossyness maintained
18.01	75.5	--	Mould growth after 28th days
20.12	86.5	--	Mould growth after 13th days
26.96	100.00	--	Mould growth after 7th days

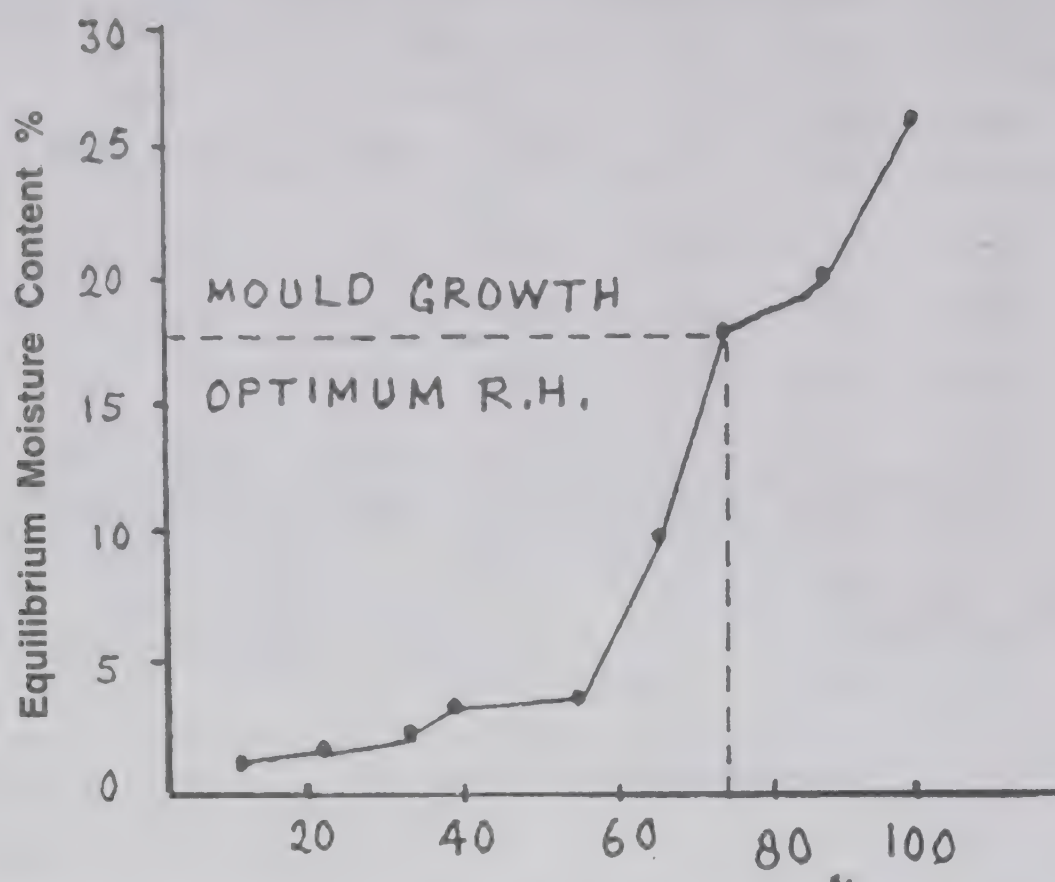


Fig. 1 Humidity Moisture Equilibrium Curve for OSMO - Dehydrated Mango Slices of Dashehari Cultivar at R.T.

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ACCEPTABILITY OF PRESERVED PRODUCTS PREPARED WITH WATERMELON RIND

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ABSTRACT

The percentage of rind was estimated and was found to constitute 33% of the whole fruit weight. Some value added preserved products like pickles, tutti fruity, *vadiyams* and cheese were prepared using the white portion of watermelon rind. The quality of the products in terms of physical parameters were evaluated. All the products were subjected to sensory evaluation test using a panel of 20 judges. The results showed that mean scores for all attributes of the products were high. There was no change in mean scores for sensory attributes after one month storage.

INTRODUCTION

The production of watermelon (*Citrullus vulgaris*) in India is about 206 thousand tonnes annually (Gill and Tomar 1991). In season, a fruit costs about Rs. 10/- per kg. Each fruit weight approximately 2 kg, out of which the rind constitutes about 30% weight. This part of the fruit is considered inedible and discarded. Watermelon belongs to the family of Cucurbits which include, muskmelon, cucumber, pumpkin, ashgourd, roundguard and there is no reported evidence that the members of this family have any antinutritional factors. Hence it can be assumed that peel of this fruit also can be consumed or used in preparation of value added products without any side effects.

Vendors who sell watermelon fruit in cut form generally discard the rind portion which is consumed by animals. This rind can be

available in bulk to small scale processors and can be used as raw material for product preparation. The white portion of the peel which is thicker is utilized while the green portion is to be discarded.

In order to assess the suitability of the newly developed products, carrying out acceptability tests becomes the most important requirement (Burdon, 1989). Hence the present study was taken up to utilise edible waste of watermelon profitably, which would otherwise be thrown away, in preparation of preserved products and test their acceptability.

MATERIALS AND METHODS

Watermelon fruits were purchased from a local fruit shop. The percentage of total waste as rind was estimated by weighing the fruit before and after removing the peel. The percentage utilisable waste was determined after removing the green portion (Table 1).

Preparation of Products : Value added products like pickles (two types), tutti fruity, cheese and *vadiyams* were prepared using watermelon rind in combination with other ingredients. Pickles and *vadiyams* were prepared using traditional home recipes (personal communication) with slight modifications. Tutti fruity and cheese were prepared after modifying standard recipes suitably. Cost of the value added preserved products was estimated and is given in Table 2.

a) Pickle-type - I : Watermelon rind was collected, cleaned and peeled free from green portion and cut into pieces of desired size. These pieces were mixed with salt and kept for a period of 5 days. Pieces were stirred daily with wooden stick in the brine solution formed to get a uniform curing. After 5 days the pieces were removed and sundried. Tamarind was soaked in the remaining brine

solution for an hour. The pieces and tamarind were ground together in a mixer. This ground paste was mixed with requisite spice powders, seasoned with mustard seeds, cumin seeds and asafoetida, in oil and filled into sterilized dry glass jars and stored.

b) **Pickle-type-II** : Watermelon rind was collected, cleaned and peeled free from green portion and cut into pieces of desired size. The pieces of watermelon rind were sun dried for an hour. Lemons were also cleaned, cut into pieces of desired size. The sundried pieces, were mixed with lemon pieces and salt and put in a sterilized jar and kept for a period of 5 days. After 5 days chillipowder, garlic, fenugreek seed powder and turmeric were added to the mixture, mixed thoroughly and stored in glass jars.

c) **Tutti fruity** : Watermelon rind was collected, washed and peeled free from green portion and made into small pieces of uniform size. Pieces were soaked in cold water containing 2% salt and 1% calcium chloride for 1/2 an hour. Water was drained and the pieces were washed with cold water. To these pieces, sugar (1/2 the weight of pieces) was added and cooked for 5 minutes. Colour (red or green) was added to the pieces and kept aside for cooling for 4 hours at room temperature. The pieces were again cooked for 5 minutes with little more sugar and 1% citric acid. This procedure was repeated till final brix was 70. Syrup was drained and pieces were washed with cold water and dried by keeping them in dryer (50°C, 30

minutes) turning the pieces once. The dried pieces were packed in polythene bages and sealed.

d) **Cheese** : Watermelon rind was collected; washed and peeled free from green portion and made into small pieces. Equal amount of water was added to the pieces and boiled till soft. The pieces were made into a pulp by grinding in a homogenizer. To this pulp, sugar was added and the mixture was heated adding small quantities of butter. Citric acid and salt were dissolved in small quantity of water and added to the mixture. When the mixture was half cooked, pectin was added and cooked till mixture left the sides of the vessel. Cold water test was used to test the end point. A stainless steel plate was greased and the cooked mixture was spread in a layer of about 1/2 inch and allowed to cool. When half set, pieces of desired shape were cut and left to set. When firm, individual pieces were wrapped in butter paper and stored in air tight container.

e) **Vadiyams** : Black gram *dhal* was washed and soaked over night. The soaked *dhal* was ground with ginger, green chillies, cumin seeds and salt. Watermelon rind was grated and the water was squeezed out. The grated rind was mixed with ground black gram *dhal* and small spoonfuls of this mixture were put on a clean polythene sheet and sun dried for two days. On thorough drying the *vadiyams* were removed from the sheet and stored in an air tight container.

The physical parameters of the standardised products evaluated

were:

a. **Pickles**: Firmness of pieces, taste, colour, aroma, aftertaste

b. **Tutti Fruity**: Firmness, juiciness, taste, colour, aftertaste

c. **Cheese** : Firmness, bite, smoothness, colour, taste, aftertaste

d. **Vadiyams** : Colour, shape, crispness, taste, aftertaste

Score card was prepared keeping in view the quality characteristics of the products. Quality rating like very good, good, fair, poor, very poor were given to quality attributes like colour, appearance, aroma, taste, texture, aftertaste and overall acceptability. Numerical scores (5-1) were assigned to each quality attribute. For high quality rating a score of 5 was assigned and 1 for least quality rating.

The acceptability of freshly prepared products was assessed by a panel of 20 judges on two alternate days. Mean scores for each product in terms of the quality attributes were calculated.

Storage studies were conducted by keeping pickles in glass jars and tutti fruity, *vadiyams* and cheese in HDPE (High Density Polythene) bags for 30 days at room temperature.

The acceptability of products was judged by the same group of panelists after 30 days of storage period to evaluate their storage quality. The same score card was used for testing acceptability of stored products. Mean of scores for two day evaluation for each attribute were calculated.

RESULTS AND DISCUSSION

The percentage of edible waste was estimated and the components of watermelon fruit and their proportions are given in Table 1. It can be noted that about 33% of the weight of watermelon is the peel which is thrown as a waste product. Out of this the white portion was found to constitute 29.3% i.e., 87% of the total rind weight. Similar results were reported by Kumar (1985), who reported that about 33% portion of the watermelon fruit is peel out of which about 4.36% is the outer green portion and 29% is the inner whit portion.

Acceptability Studies : All products scored high in terms of attributes like colour, appearance, aroma,

taste, texture, aftertaste and overall acceptability both before and after storage for one month at a mean temperature and relative humidity of 27.33°C and 68.63% respectively. The results of sensory evaluation study revealed that there was no change in acceptability of products at the end of the storage period (Table 3).

Thus, from the present study, it can be concluded that, watermelon fruit waste which is discarded as inedible, can be used in preparation of value added products which, as in the study, were found to be highly acceptable by the consumer. They have good keeping quality and can be used at house hold level. They have potential for small scale production

and when commercially marketed, they can fetch a high demand as these will serve to reduce the cost and provide acceptable quality products to the consumer. These preserved products can be prepared with small investment and can be very profitable to the entrepreneur.

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TABLE - 1
Components of Watermelon and their proportions

S.No.	Fruit Weight	Edible Portion Kg.	% of Fruit. Weight	Whole Rind Weight Kg.	% of Fruit Weight	Utilizable waste (White Portion) Kg	% of Fruit Weight	Green portion Kg.	% of Fruit Weight
1.	5.620	3.760	66.91	1.859	33.09	1.629	29.00	0.229	4.09
2.	5.660	3.746	66.20	1.913	33.80	1.686	29.80	0.226	4.00
3.	5.550	3.669	66.72	1.775	32.28	1.598	29.07	0.231	4.21
4.	5.650	3.771	66.76	1.878	33.24	1.649	29.10	0.228	4.05
5.	5.120	3.424	66.89	1.695	33.11	1.486	29.03	0.208	4.08
Average	5.520	3.674	66.69	1.824	33.10	1.610	29.21	0.224	4.09

Table - 2 Weights and Cost of Products

S.No.	Product Name	Rind Weight (White portion) (Kg)	Weight of Final Products (g)	Cost/Kg of Prepared product (Rs)
1.	Pickle Type - I	1 Kg	775 gms	40.00
2.	Pickle Type- II	½ Kg + 10 Limes	920 gms	30.00
3.	Tutti Fruity (Red & Green)	1 Kg	750 gms	30.00
4.	Cheese	1 Kg	900 gms	40.00
5.	Vadiyams	3 Kg	1000 gms	35.00

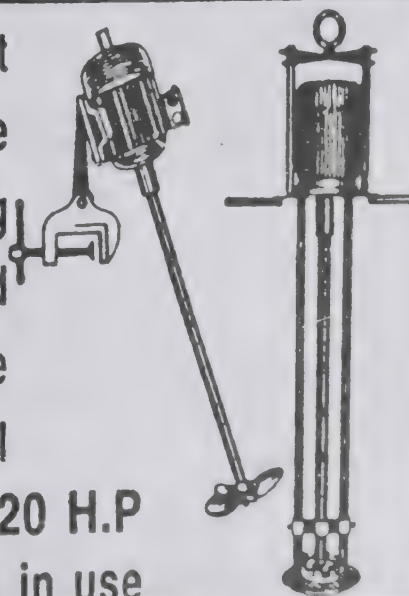
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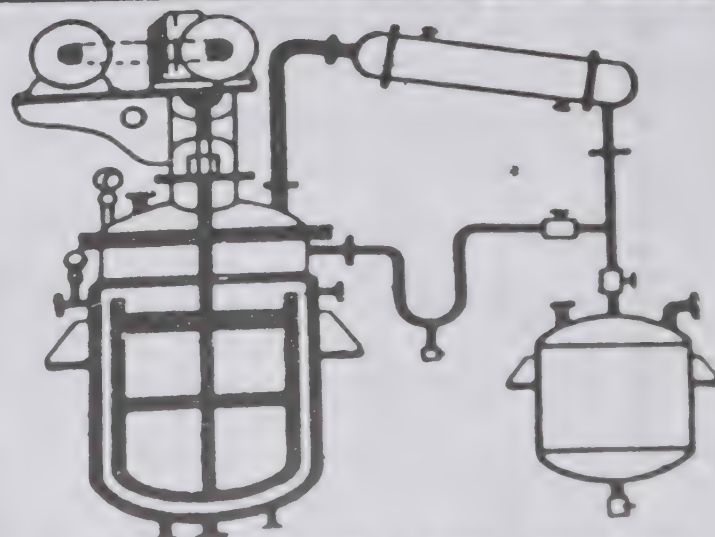
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Table - 3
Mean Scores of sensory evaluation of fresh and stored preserved products

Attribute	Sample	Products					
		1 (5)	2 (5)	3 (5)	4 (5)	5 (5)	6 (5)
Colour	Fresh	5.0	5.0	5.0	4.8	5.0	4.9
	Stored	5.0	5.0	5.0	4.8	5.0	4.9
Appearance	Fresh	5.0	5.0	5.0	5.0	5.0	5.0
	Stored	5.0	5.0	5.0	5.0	5.0	5.0
Aroma	Fresh	5.0	5.0	4.9	4.8	5.0	5.0
	Stored	5.0	5.0	4.9	4.8	5.0	5.0
Taste	Fresh	5.0	5.0	5.0	5.0	5.0	5.0
	Stored	5.0	5.0	5.0	5.0	5.0	5.0
Texture	Fresh	5.0	5.0	5.0	5.0	4.8	5.0
	Stored	5.0	5.0	5.0	5.0	4.8	5.0
Aftertaste	Fresh	5.0	5.0	4.8	4.8	5.0	5.0
	Stored	5.0	5.0	4.8	4.8	5.0	5.0
Overall acceptability	Fresh	5.0	5.0	5.0	5.0	5.0	5.0
	Stored	5.0	5.0	5.0	5.0	5.0	5.0

1. Pickle-type - I 2. Pickle-type - II 3. Tutti Fruity(red) 4. Tutti fruity(green), 5. Cheese, 6. Vadiyams.

Scores : 1=Very poor, 2=Poor 3=Fair 4=Good 5=Very good.

PRESERVATION OF KINNOW JUICE

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ABSTRACT

The present paper reports the studies made to explore the possibility of enhancing the keeping quality of kinnow juice. The recovery of juice was found 49.6% by using screw extraction method in comparison to 47.2% by Reamer extraction method. From the various treatments (KMS, addition of sucrose, pectin and increase in degree brix), addition of KMS was observed to be the best and it enhanced the shelf life for two weeks at refrigeration temperature.

INTRODUCTION

Kinnow, a hybrid of *Citrus nobilis* x *Citrus delicosa* contributes towards major fruit production of the state of Punjab. Its annual production is more than 24,470 MT mainly in the state of Punjab, Haryana and Delhi (Sharma & Singh, 1993).

The problem of bitterness and delayed bitterness has been associated with the kinnow fruit juice due to the presence of naringin and limonin respectively (Marwaha et al., 1994). Various efforts have been made to remove the bitterness (Chandler & Johnson, 1977; Renote & Bains, 1982; Marwaha et al., 1994). Recently, the suitability of kinnow fruits for the production of wine was reported (Singh et al., 1998). Citrus fruit juices in general and kinnow juice, in particular, have a very poor shelf life because of the presence of heavy pulp, which

encourages its microbial spoilage. Consequently, the preparation and preservation of kinnow fruit juice are the major post-harvest problems. Therefore, the present study was aimed at preserving kinnow juice at ambient and refrigerated temperature.

MATERIALS AND METHODS

PROCUREMENT OF KINNOW FRUITS

The freshly harvested kinnow fruits were procured from the local market of Sangrur and were packed individually in properly sealed HDPE bags. These bags were stored at refrigerated (11°C) conditions for further use.

EXTRACTION OF JUICE

Kinnow fruits were subjected to two extraction methods, given as follows:

1) Hand Reamer Method: Fruits were cut into halves and the cut

portion was pressed against the rotating cone of Hand Reamer. The extracted juice was filtered through muslin cloth and then subjected to various treatments.

2) Screw Extraction Methods: Fruits were manually peeled and the rag portion was also removed. The peeled fruits were fed to power operated screw extractor and juice obtained was filtered and used for further study.

Addition of Additives

Various concentrations of KMS, sucrose and pectin were added directly to juice at room temperature. For achieving the specified level of brix (TSS), sugar syrup of 70°brix was used.

Packaging and Storage of Juice

Juice was filled in cleaned and sterilized glass bottle. Filled bottles containing 200ml of juice and having a head space of 2cm were properly sealed and stored at

ambient (32°C) and refrigerated temperature (11°C)

Physico-Chemical Analysis :

Juice was analyzed for titratable acidity and ascorbic acid using the standard methods (Ranganna, 1986) and pH of the samples was noted using digital pHmeter after a specified time period given in respective tables. TSS of the sample was adjusted and measured through hand refractometer (Erma company).

Sensory Evaluation Method

Sensory analysis was carried out by a panel of judges using a 10 point scale for each of the attributes viz. color, taste and aroma. The points allowed for overall acceptability are as follows:

Excellent - 9, Very Good - 8, Good - 7, Fair - 6, Undecided - 5, Poor - 4, Slightly poor - 3, Very poor - 2 & Extremely poor - 1.

RESULTS AND DISCUSSION

Juice obtained from kinnow fruit having 10° Brix, acidity 0.40%, pH 4.41 and ascorbic acid content 28.84 mg/100gm was preserved at room and refrigerated temperatures and was observed for its quality after specified period of time given in respective tables. As the storage period increased from 0 to 3 hr and 0 to 7 hr, ascorbic acid content of juice decreased to 18.87 mg/100gm and 19.01 mg/100gm while percent acidity increased to 0.62 and 0.49 at room and refrigerated temperature respectively (Table 1). Juice obtained from Reamer extraction and Screw extraction methods were

found to have same trend in terms of acidity, pH and ascorbic acid content. The recovery of juice was 47.2% from Reamer extraction method in comparison to 49.6% from Screw extraction method. The difference might be due to more shear applied in latter case. Results from Table 1 clearly indicated that juice can be preserved for 3 and 7 hr at room and refrigerated temperature respectively. Afterwards, juice becomes unacceptable in its taste and aroma which can be substantiated from the sensory score viz. 4.0 & 4.5 at room and refrigerated temperature respectively. Unacceptability might be caused due to proliferation of microbial growth and increase in limonin and naringin contents (Marwaha et al., 1994).

Preservation of juice, extracted by Reamer extraction method was also carried out after treating it with different additives. With increase in concentration of KMS (Potassium meta bisulfite) from 50 to 350-ppm there was an increase in acidity during the initial period both at room and refrigerated temperature. The percent acidity increased from 0.43 to 0.46 (Table 2). Increase in acidity might be caused by some of the acid producing micro-organisms and ions produced by KMS. No significant difference was observed in ascorbic acid content. At room temperature keeping quality of kinnow juice could not even sustain to one week even at high level of 350 ppm KMS concentration. The samples were found to be unacceptable after a week due to changes in

sensory attributes. The acceptable quality of juice can be obtained even after two weeks of storage only at refrigeration temperature at a concentration of 350 ppm KMS.

The bitterness in kinnow juice which is generally attributed to glucosides present in albedo pulp is a major problem. Therefore, enhancement in the sugar concentration may play significant role in the preservation and masking of bitterness in the juice. With the addition of sugar syrup (70° brix) to kinnow juice for a specific level of brix given in respective Table 2, a marked decrease in acidity and ascorbic acid content was notified. Ascorbic acid content and percent acidity decreased from 23.9 to 16.1 mg/100gm & 0.56 to 0.36 respectively as the level of total soluble solids through sugar syrup increased from 10 to 45°, which can be well explained from the increase in total soluble solids by sugar syrup which hardly contains any amount of citric acid. The shelf life of kinnow juice with 45°brix was two weeks and one week at refrigerated and room temperatures respectively.

Juice containing sucrose and pectin to a desired level of brix was also observed for its keeping quality. Sample containing sugar and 0.1% pectin to a level of 20°brix can easily be stored for one week at refrigerated temperature. The ascorbic acid content and acidity decreased due to addition of sucrose. Addition of pectin to kinnow juice may be helpful in preventing the reduction of ascorbic acid content to a certain extent, as the ascorbic

acid was 15.20 mg/100gm after a week compared to the initial value of 15.23 mg/100gm (Table 2). However, as it could not bind the bitter compounds (limonin and naringin) present in the sample, the problem of bitterness still persisted.

Table 3 shows the shelf life of kinnow juice extracted by Screw extraction method at room and refrigerated temperatures. The sample obtained was found to have similarity in shelf life with the other sample of juice obtained from Reamer extraction method. The variation in acidity, ascorbic acid with respect to KMS concentration, °brix, sugar and pectin concentration was also found to be similar as given in Table 2.

From the above study, it can be concluded that the recovery of juice by Screw extraction method was more than the Reamer extraction method. Among various treatments, KMS at a concentration of 350 ppm showed promising results. Although, preservation of juice by the addition of sugar syrup at a particular level also showed good results, its use can be very limited due to much increase in sweetness.

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ALSO FROM NOGA: JUICES FRUITS SQUASHES SAUCES

THE MAHARASHTRA AGRO-INDUSTRIES DEVELOPMENT CORPORATION LIMITED, Rajan Bhawan, 3rd Floor, Panchadevi, Bombay 400 026. Ph: 4220453, 4305416

Table 1 : Effect of Temperature on preservation of Kinnow Juice

Method of extraction	Time (hr)	°B	%Acidity	pH	AsA	Sensory Score	% Recovery
Reamer Extraction							
Stored at Room Temperature							
	0	10	0.40	4.41	28.84	8.0	47.2
	1	10	0.47	4.08	22.14	7.5	
	2	10	0.51	3.80	20.36	7.0	
	3	10	0.54	3.76	18.87	6.0	
	4	10	-	-	-	4.0	
Stored at Refrigerated Temperature							
	0	10	0.40	4.41	28.84	8.0	
	1	10	0.45	4.36	24.32	8.0	
	2	10	0.46	4.22	21.53	7.5	
	3	10	0.461	4.12	20.46	7.5	
	4	10	0.465	4.02	20.36	7.0	
	5	10	0.473	3.97	20.17	6.5	
	6	10	0.490	3.83	19.06	6.5	
	7	10	0.491	3.84	19.01	6.5	
	8	10	-	-	-	4.5	
Screw Extraction							
Stored at Room Temperature							
	0	10	0.39	4.40	28.94	8.0	49.6
	1	10	0.45	4.12	23.14	7.0	
	2	10	0.50	3.80	20.96	7.0	
	3	10	0.54	3.76	18.97	6.0	
	4	10	-	-	-	4.0	
Stored at Refrigerated Temperature							
	0	10	0.39	4.40	28.94	8.0	
	1	10	0.48	4.35	24.82	7.5	
	2	10	0.46	4.24	21.83	7.5	
	3	10	0.461	4.12	20.76	7.5	
	4	10	0.465	4.00	20.56	7.0	
	5	10	0.473	3.92	20.27	7.0	
	6	10	0.490	3.80	19.12	6.5	
	7	10	0.491	3.82	19.08	6.0	
	8	10	-	-	-	4.5	

where

°B-brix

AsA -Ascorbic acid (mg/100gm)

% Acidity was calculated in terms of citric acid

Results are average of three individual experiments

- = Not Determined

TABLE - 2 Effect of Different Additives on Preservation of Juice,
Extracted by Reamer Extractor

Sample containing different additives	Storage period (week)																									
	Room Temperature							Refrigeration Temperature																		
	Initial values			After one week				Initial Values			After one week															
	B	AA	AsA	pH	SS	B	AA	AsA	pH	SS	B	AA	AsA	pH	SS	B	AA	AsA	pH	SS						
Control (C)	10	0.43	18.07	4.12	8.0	-	-	-	-	-	4.0	10	0.43	18.07	4.12	8.0	-	-	-	-	4.0	-	-	-	-	3.5
C-KMS (50 ppm)	10	0.43	18.07	4.12	8.0	-	-	-	-	-	3.5	10	0.43	18.07	4.12	8.0	-	-	-	-	4.0	-	-	-	-	4.0
C+KMS (150 ppm)	10	0.44	18.15	4.11	8.0	-	-	-	-	-	4.0	10	0.44	18.15	4.11	8.0	-	-	-	-	5.0	-	-	-	-	3.5
C-KMS (250 ppm)	10	0.44	18.01	4.10	8.0	-	-	-	-	-	3.5	10	0.44	18.01	4.10	8.0	-	-	-	-	3.5	-	-	-	-	4.0
C-KMS (350 ppm)	10	0.46	18.26	4.10	8.0	-	-	-	-	-	5.0	10	0.46	18.26	4.10	8.0	10	0.48	14.2	4.08	6.5	10	0.50	12.98	4.01	6.0
Control (C)	10	0.56	23.9	3.82	8.0	-	-	-	-	-	4.0	10	0.56	23.9	3.82	8.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Syrup	25	0.50	20.2	3.98	7.0	-	-	-	-	-	4.0	25	0.50	20.2	3.98	7.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Syrup	30	0.48	19.8	4.09	7.0	-	-	-	-	-	3.5	30	0.48	19.8	4.09	7.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Syrup	35	0.40	19.2	4.20	7.0	-	-	-	-	-	4.0	35	0.40	19.2	4.20	7.0	35	0.42	15.3	4.16	6.0	-	-	-	-	4.0
C-Syrup	40	0.38	18.1	4.25	6.5	-	-	-	-	-	3.5	40	0.38	18.1	4.25	6.5	40	0.46	13.7	4.20	6.0	-	-	-	-	5.0
C-Syrup	45	0.36	16.1	5.08	6.5	45	0.38	8.6	5.02	6.0	-	45	0.36	16.1	5.08	6.5	45	0.39	11.2	5.02	6.0	46	0.42	8.4	5.00	6.0
Control (C)	10	0.44	18.24	4.30	8.0	-	-	-	-	-	4.0	10	0.44	18.24	4.30	8.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Sucrose	15	0.41	16.13	4.40	7.5	-	-	-	-	-	4.0	15	0.41	16.13	4.40	7.5	-	-	-	-	4.0	-	-	-	-	4.0
C-Sucrose	20	0.39	15.23	4.46	7.0	-	-	-	-	-	4.0	20	0.39	15.23	4.46	7.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Sucrose + 0.1% pectin	15	0.42	16.14	4.32	7.0	-	-	-	-	-	3.5	15	0.42	16.14	4.32	7.0	-	-	-	-	4.0	-	-	-	-	4.0
C-Sucrose + 0.1% pectin	20	0.40	15.23	4.36	7.0	-	-	-	-	-	4.0	20	0.40	15.23	4.38	7.0	20	0.41	15.2	4.36	5.0	-	-	-	-	4.0

where

Bx = brix

AA = Acidity (was calculated in terms of citric acid)

AsA = Ascorbic acid (mg/100 gm)

SS = Sensory Score

-- = Not determined

Results are average of three individual experiments

TABLE - 3 Effect of Different Additives on Preservation of Juice,
Extracted by Screw Method

Sample containing different additives	Storage period (week)									
	Room Temperature					Refrigeration Temperature				
	After one week					After one week				
Initial values	Initial Values					Initial Values				
	B	AA	AsA	pH	SS	B	AA	AsA	pH	SS
Control (C)	10	0.52	21.4	4.01	8.0	-	-	-	-	4.0
C-KMS (50 ppm)	10	0.52	21.4	4.01	8.0	-	-	-	-	4.0
C-KMS (150ppm)	10	0.53	21.46	3.96	8.0	-	-	-	-	4.5
C-KMS (250ppm)	10	0.54	21.25	3.95	8.0	-	-	-	-	4.0
C-KMS (350ppm)	10	0.56	21.20	3.90	8.0	10	0.57	19.19	3.92	6.0
										10
Control (C)	10	0.52	21.4	4.01	8.0	-	-	-	-	4.0
C-Syrup	25	0.51	20.1	4.06	7.0	-	-	-	-	4.0
C-Syrup	30	0.50	19.7	4.13	7.0	-	-	-	-	4.0
C-Syrup	35	0.48	18.3	4.26	7.0	35	0.49	17.6	4.20	6.0
C-Syrup	40	0.46	17.5	4.28	6.5	40	0.48	16.4	4.20	6.0
C-Syrup	45	0.42	16.4	4.47	6.5	45	0.46	15.1	4.15	6.0
										45
Control (C)	10	0.46	19.82	4.18	8.0	-	-	-	-	4.0
C-Sucrose	15	0.44	17.53	4.23	7.5	-	-	-	-	3.5
C-Sucrose	20	0.42	16.12	4.34	7.0	-	-	-	-	3.5
C-Sucrose	15	0.45	18.52	4.20	7.5	-	-	-	-	4.0
0.1% pectin										
C-Sucrose	20	0.44	17.82	4.30	7.0	20	0.44	16.83	4.28	5.0
0.1% pectin										
										4.0

where

where

Bx = brix

AA = Acidity (was calculated in terms of citric acid)

AsA = Ascorbic acid (mg/100 gm)

SS = Sensory Score

- = Not determined

Results are average of three individual experiments.

QUALITY EVALUATION OF CANNED WHOLE 'DWARF' GOLDEN APPLES (*SPONDIAS CYTHEREA*) IN SUCROSE SYRUP

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ABSTRACT

'Dwarf' golden apples (*Spondias cytherea*) were canned in a 30° Brix sucrose syrup (WL) and 40° Brix sucrose Syrup (WH). Processing was either by hot filling the syrup at 92°C in filled cans or by steam exhausting of the filled cans at 85° for 12-14 minutes, followed by processing at 100°C for 20minutes (WL20; WH20) or 30 minutes (WL30; WH30). Sensory evaluation of the commercial sterile products (WL₃₀; WH₃₀) indicated that there were no significant differences ($P>0.05$) in appearance, colour, taste, aroma and texture. Fruits in 40°Brix Syrup were firmer than in 30°Brix Syrup. The overall sensory scores of the canned products indicated they were liked definitely to liked slightly. By week 8 of storage at 28-30°C, pH of the products was stable at 3.3 - 3.5, and cut out Brix were 24° and 28.5 for WL₃₀ and WH₃₀ canned products, respectively.

INTRODUCTION

The golden apple, *Spondias cytherea* Sonn. (*Spondias dulcis* Forst) belongs to the *Anacardiaceae* family¹. Among various colloquial names are 'Otaheite apple', Tahitian quince', Polynesian plum' and 'Jew plum'. The fruit derives its name, golden apple, from its yellow colour, which is associated with ripeness². An investigation was conducted on the production of the "tall" variety of golden apples, with particular emphasis on post-harvest technology and on preliminary processing³. The introduction of the 'dwarf' variety of the fruit in the West Indies has resulted in many advantages to the processor over the existing 'tall' variety. harvesting of the fruit is easier, thus less susceptible to bruising fruits are smaller and more uniform size,

spines are softer, skin is thinner and the pulp is not as acidic⁴. The 'dwaf' variety flowers three or four times an year and starts bearing in six months after planting of the seed⁵. Physiological changes in the fruit occur after harvest, which can make them unfit for consumption. The unripe fruits in the West Indies have been used as pickles or relishes. The objectives of the research were (i) to process the fruits by canning of the whole 'dwarf' variety of golden apples in syrup and to (ii) evaluate the quality attributes of the product on storage, thereby extending storage life and addig value.

MATERIALS AND METHODS

Dwarf Golden Apples : Unripe mature golden apples (*Spondias cytherea*) of the dwarf variety were obtained gratis from the Cocoa Research Unit, The University of the

West Indies and the Arima Nursery, Freeport, Trinidad.

Fruits with attached peduncles were harvested and allowed to ripen in a shorter period (9 days), as compared to fruits without attached peduncles (12 days)³. The fruits, initially green and hard turn golden- yellow to orange in skin and flesh when ripe⁶ and has a desirable odor⁷. The unsuitable portions of the fruits were removed to reduce the level of fungal infection³. The fruits were weighed, graded according to size (ratio of length to diameter) and degree of ripeness as judged by peel colour. The fruits were washed and then soaked for 20 minutes in chlorinated water (300 ppm), allowed to air dry and packed (20-40 fruits) in sanitized open boxes stored at 20-30°C. As the fruits ripened, they were removed and

refrigerated, and the orange - yellow mature fruits selected for processing.

Canning of Whole Golden Apple : Figure 1 shows the processing steps in the production of canned whole golden apples. Stem tips were removed and fruit immersed for 20 minutes in chlorinated water (300 ppm). Fruits were either subjected to hand peeling, steam peeling or lye peeling. In steam peeling, the fruits were exposed to low steam at 100°C for 6-8 minutes. The fruits were also soaked for 30-60 seconds in either 5% or 10% lye solution at 28-80°C for 30-60 seconds. Weight of the fruits was determined before and after peeling for calculation of percentage peel loss. Peel yield depends on the temperature and concentration of lye solution as well as immersion time⁸. Approximately 6 - 8 fruits were filled into sanitized lacquered cans of size no. 300(300 x 407, National Canners Limited, Trincity, Trinidad). According to Codex Alimentarius Standard for the minimum fill of canned peas (61-1981)⁹, the container should be well filled with fruit and the product (packing medium) should occupy not less than 90% of the water capacity of the container. Filling medium was in the form of sucrose syrup prepared by heating white cane sugar (Caroni (1975) Limited, Trinidad,) in water at 92°C for 15 minutes. Cans were filled either with a light syrup of 30°Brix (WL:430g sucrose/L of water) or heavy syrup of 40°Brix (WH:669g sucrose/L of water) leaving headspace of 1-1.2 cm. Soluble solids as expressed in °Brix were measured by a hand held

refractometer (0-50°Brix, Reichert Jung, Cambridge Instrument, Inc, USA).

Syrup at 92°C was either hot filled into the cans with fruits and sealed at 75°C-80°C, or the filled cans (fruits with syrup) were covered with lids, left unsealed and steam exhausted for 10-14 minutes till the internal can centre temperature reaches 85-87°C and then sealed. Cans were processed in boiling water (100°C) for 20 minutes (WL₃₀, WH₃₀) or for 30 minutes (WL₃₀, WH₃₀). The low pH of the helped in application of low thermal heat treatment, without the need for the addition of acid or preservatives⁴. Cans were cooled to 38 - 39°C in chlorinated water (5ppm chlorine) and stored in cardboard boxes at 28-30°C.

Experimental Design : The experiment was replicated and consisted of varying the pre-processing treatment of either hot filling the cans with syrup or steam - exhausting the filled cans and hot water processing (100°C) in a 30°Brix or 40°Brix. Syrup for 20 minutes (WL₂₀, WH₂₀) or 30 minutes (WL₃₀, WH₃₀).

Physicochemical, microbiological and sensory analysis were conducted after week 2 of storage for cans processed by the hot filled method and after 2,4,6 and 8 weeks for cans processed by steam exhausting.

Physico-Chemical Analysis : Gross weight represented the combined weight of the can and contents and was expressed in grams. Net weight of the content was found by subtracting the weight of the can

from the gross weight. The can was emptied, washed and dried prior to being weighed (Mettler No. 60, Delta Range Digital Balance, Gallenham, USA).

Total soluble solids (°Brix) was measured on the sucrose syrup and on the 'cut-off' Brix of the syrup. Measurement was by a hand-held refractometer (0-50°Brix, Reichert-Jung, Cambridge Instrument, USA)

Vacuum (Hg) of the cans was measured with a vacuum pressure guage (Marshall Town, USA). The rubber gasket of the vacuum guage was sterilised with alcohol and the pointed end of the instrument was used for piercing of the lid of the can.¹⁰ Headspace of the cans was measured and expressed in cm¹⁰.

The pH of the syrup was measured on a pH meter (Acumet No. 910, Fisher Scientific Instrument, Hampton, USA) after the electrodes were standardized with buffer solutions at pH4 and pH7.

Titraable acidity, expressed as percent malic acid, was measured by filtering a 20 ml aliquot of the syrup, which was adjusted to the 130 ml level with distilled water, and filtered (No. 541 Whatman paper) and titrated with 0.1N NaOH using phenolphthalein as an indicator using the method of AOAC, No. 22.058¹¹.

Cans were emptied, washed and examined internally and externally. Internal surface of the cans was examined for corrosion, defects, discoloration and lacquer. External surface of the cans was examined for corrosion, defective seams, leaks, mechanical damage and swelling¹⁰.

Microbiological Analysis : Six randomly chosen canned samples from each processing treatment were incubated at 35°C for 7 days (accelerated shelf life) and examined microbiologically. Each can was washed with chlorinated water (3% chlorine) and the lid swabbed with 95% ethanol and flamed. A sample was transferred septically to a sterile plastic bag and homogenised in a stomacher (400, A.J. Steward Company, Limited) for 1 minute. Serial dilutions were prepared using Ringer's solution¹². Duplicate petri dishes containing Brain Heart Infusion Agar (BHI, Oxoid Unipath Limited, U.K.) or de Man, Rogosa and Sharpe Agar (MRS, Oxoid, Unipath Limited, U.K.) were inoculated with 1ml of each dilution. The BHI plates were incubated at 37°C or 55°C for 48 hours under aerobic and anaerobic conditions.

Petri dishes of MRS agar with an overlay were incubated at 37°C for 24 hours. The micro-organisms were enumerated and expressed as CFU/g¹².

Duplicate petri dishes of acidified Malt Extract Agar (MEA, Oxoid Unipath Limited, U.K.) were inoculated with 0.2ml of each serial dilution and incubated at 26°C for 5 days to detect the presence of yeasts and moulds. The presence of coliforms was observed by inoculating 0.1ml of each dilution in duplicate petri plates containing Violet Red Bile Agar (VRBA), Oxoid Unipath, U.K.) with an overlay. The plates were incubated at 37°C for 24 hours.

Sensory Analysis : A semi-trained panel of 24 persons was selected from post-graduate students and staff of the Food technology Unit, The University of West Indies, Trinidad, West Indies, based on their willingness to participate and knowledge of sensory evaluation methodology. The canned products were chilled at 15-18°C and the whole golden apples in syrup (WL₂₀; WH₃₀; WL₂₀; WH₃₀) served with a questionnaire to panelists through individual booths. A preference/acceptance test was conducted to determine the degree of likeness/acceptability for canned whole fruits in 30°Brix syrup (WL₃₀). Panelists were asked to rate the attributes of appearance, colour, taste, aroma and texture based on a 5-point hedonic scale (1-like definitely; 3-neither like nor dislike; 5-dislike definitely). Also the willingness of the panelist to purchase the canned products and descriptive comments were also solicited. The sensory evaluation tests were duplicated and the data subject to analysis of variance (5% level of significance) using CARDI's Statistical Package (Caribbean Research and Development Institute, 1995), to investigate the effects of the 30°Brix syrup and 40°Brix syrup on the sensory attributes of the canned golden apples.

RESULTS AND DISCUSSION

Physicochemical Analysis of Golden Apple : Table 1 gives the physicochemical data for the 'dwarf' variety of golden apples as compared to the measurements obtained from data of the 'tall'

variety of golden apples³. The 'dwarf' variety of the fruits was ideally suited for canning as they were smaller in both length and diameter, had a thinner skin, a lower stone weight, and acidity (% malic acid) and possessed a higher ratio of °Brix to acid when compared to the 'tall' variety of the fruit. Mature fruits were selected as prior work³ indicated that the fruit weight and pulp yield of edible parts increased during growth and maturity. Also a high ratio of °Brix to acidity was also associated with better ripe colour and flavour.

The average period of ripening of the 'dwarf' variety of golden apples was 7-9 days on storage at 28-30°C, which was shorter than that reported for the 'tall' variety of golden apples³. Maturity of the fruit can be based on flesh and skin colour, as skin colour tends to change from deep green to a pale yellow colour, then to a golden yellow on ripening⁵. It was also observed, as the fruits ripened, brown spots on the fruits were inclined to become soft. There was tendency for fruits to ripen unevenly, creating zones with different stages of texture.

Peeling Analysis:

Table 2 shows the comparison of the effectiveness of the different peeling methods applied to the ripe 'dwarf' golden apples, in preparation for canning. Steam peeling was most effective and the easy removal of peel resulted in lower percentage of peel loss. In the evaluation of a peeling process, the quality of the remaining flesh and product losses

are critical¹³. Total percentage loss from sorting, trimming, peeling and chopping varied from 23-27. Rejection of the fruit for processing was mainly due to fungal infection and other manifestations, such as rotting parts, scarring, immaturity, over-ripeness, mechanical damage, bruises, deformity and undersize. These problems can be alleviated by improvement in selection of the fruits, harvesting practices and post-harvest handling.

Canning by Hot Filling : The drained weight of the canned products ranged from 50.8 - 53.8% which was acceptable as it exceeded the minimum standard for canned pears whole style (Codex Stan 61-1981)⁹.

The vacuum of the cans was between 9-12 in Hg. In most canned foods, the vacuum should be between 10-20 in Hg¹⁴. Thus the low vacuum in processed cans may have resulted from adequate pre-vacuum condition created by low filling temperature. The pH of the syrup was 3.0 - 3.1 Brix of cut-off syrup (WL₂₀; WH₃₀) was between 20.5 - 21.5 and for cans filled with 40°Brix syrup (WL₂₀; WH₃₀) it was between 28.5 - 29.0. The concentration of the 'cut-off' Brix may have depended on the percentage of added sugars, sugars in the fruit and the weight of the syrup added. There is a narrower variation in 'cut-off' °Brix with smaller fruits¹⁸.

The internal and external conditions of the cans were good. Panelists indicated that the fruits canned in 40°Brix syrup (WL₂₀; WH₃₀) were

firmer than those canned in 30°Brix syrup (WL₂₀; WH₃₀). Canning in syrup allows for water to be withdrawn from the cell walls of the fruit¹⁵. The fruits processed in 30°Brix syrup were light yellow as compared to fruits in 40°Brix syrup which were brown. In canning, the syrups are added to improve the flavour, fill the space between the pieces of fruits and for the transfer of heat during processing¹⁴. Heating of carbohydrates such as sucrose and reducing sugars without nitrogen containing compounds effects a complex group of reactions termed caramelisation, which can result in a brown colour¹⁶.

The presence of aerobic and anaerobic mesophiles of less than 120CFU/mL indicated inadequate sterilization. Hence there was the need for a higher can sealing temperature, to create a higher vacuum. Aerobic thermophiles (10-20 CFU/ml) were detected only in samples WL₂₀ and WH₃₀. Yeasts and moulds were found in samples WL₂₀ and WH₃₀. Moulds can be prevented by boiling water-processing and having a strong vacuum seal¹⁷. Coliforms and lactic acid bacteria were not detected in all treatments.

Canning by Steam Exhausting: Table 3 and 4 show the physicochemical data on storage of canned whole 'dwarf' golden apples in 30°Brix (WL) and 40°Brix (WH) processed by steam exhausting.

The range of internal pressure (12-15 in Hg) measured in cans processed by steam exhausting was higher than in cans processed by the hot filling method (Table 2).

Vacuum is an indication of the amount of air in the headspace of the can. Low oxygen in cans is desirable to minimise oxidation of vitamins to prevent discolouration and to ensure that the cans are concave with adequate internal pressure¹⁴. The headspace of the canned fruits ranged from 0.95 to 1.5 cm. All things being equal, the vacuum in a can after sealing and processing will vary inversely with the volume of the headspace at the time of sealing¹⁸.

The average °Brix of the 'cut-off' syrup by week 4 of storage had stabilised at 28.5° for canned fruits in 40°Brix (WL₂₀; WH₃₀), and at 24.0° for canned fruits in 30°Brix. There was a greater loss of soluble solids (28.75) in syrup of canned products in 40°Brix when compared to the loss of 20.0% in canned fruits in 30°Brix syrup (WL₂₀; WH₃₀) by week 8 of storage.

The pH of the syrup in the canned products was 3.3 - 3.5. There were slightly higher °Brix to acid ratios for whole fruits in 40°Brix syrup (WL₂₀; WH₃₀) as against whole fruits canned in 30°Brix syrup (WL₂₀; WH₃₀).

Yeasts and moulds, lactic acid bacteria, coliforms, aerobic and anaerobic mesophiles and thermophiles were absent in canned samples processed at 100°C for 30 minutes (WL₂₀; WH₃₀). However, canned products processed for 20 minutes, WL₂₀ and WH₃₀ had mesophilic microorganisms (10-80 CFU/ml). Acid foods can safely be processed at boiling water temperature since it kills all vegetative cells that would normally grow

under storage condition¹⁷.

Sensory Evaluation : There were no significant differences ($P>0.05$) in 'likeness' for whole fruits canned in 30°Brix syrup, WL₃₀ or in 40° Brix syrup (WH₃₀) for sensory attributes of colour, taste, texture and for overall acceptability. Panelists indicated no significant preference ($P>0.05$) to purchase either canned samples in 30° Brix or 40° Brix syrup. The golden apples in 40°Brix syrup had more acceptable flavour and were firmer as compared to the golden apples in 30°Brix syrup. Panelists indicated that canned products processed by steam exhausting had a more desirable colour and flavour over the canned samples processed by the hot filling method. The golden apples were of an attractive, golden, yellow colour. The overall scores for sensory attributes for canned products WL₃₀ and WH₃₀ indicated that they were liked 'slightly' to 'like definitely'.

CONCLUSION

The 'dwarf' variety of golden apples was suitable for canning in syrup as they were smaller, uniform in size and had higher °Brix/acid when compared to the 'tall' variety. Steam exhausting of the filled cans at 85°C for 10-14 minutes, followed by hot water processing (100°C) for 30 minutes resulted in a commercially sterile product. Although there were no significant differences ($P>0.05$) in quality attributes in canned products with 30°Brix or 40°Brix syrup, panelists

indicated that the golden apple in 40° Brix syrup were firmer.

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Table 1 Physico-Chemical of 'DWARF' Golden Apples and 'Tall' Golden Apples

Parameter	Mean	
	Dwarf Variety	Tall Variety*
Fruit Length (cm)	5.10	7.40
Fruit Diameter (cm)	3.90	6.00
Ratio of L/D	1.30	1.24
Skin Thickness (cm)	0.15	1.01
Pulp Thickness (cm)	1.62	3.00
Stone Length (cm)	2.10	2.10
Spine Length (cm)	1.10	1.20
Fruit Weight (g)	44.80	155.00
Stone Weight (g)	5.12	13.70
Pulp Weight (g)	34.50	122.50
Pulp Yield (%)	77.30	79.00
Ratio of Pulp to Seed	6.75	8.90
Titratable Acidity (% malic)	0.63	0.83
Total Soluble Solids (°Brix)	11.00	11.09
Ratio of °Brix/Acidity	17.40	14.80
Average of 26 apples		

* Source of Data on "tall" variety Daulmerie (1994)³.

Table 2 Physico-Chemical Examination of canned whole golden apples by hot-filling method

Parameters	Treatment			
	WL ₂₀	WL ₃₀	WH ₂₀	WH ₃₀
Gross wt (g)	463.0	477.0	485.2	466.6
Net wt (g)	411.0	413.0	422.2	403.6
Drained wt (g)	220.0	210.0	242.2	210.4
°Brix (syrup)	20.5	21.5	28.5	29.0
Vacuum (in Hg)	12.0	9.0	12.0	11.0
Headspace (cm)	2.0	1.5	1.3	1.2
pH of syrup	3.1	3.0	3.1	3.1
Titrateable Acidity %				
malic	0.3	0.3	0.3	0.4
Appearance of fruit	Partly cooked Clear with	Partly cooked Clear with	Cooked	Cooked
Appearance of syrup	Fragment	Fragment	Clear	Clear
Texture	Very Soft	Soft	Firm	Firm

WL₂₀ - Canned in 30°Brix Syrup at 100°C for 20 minutes.

WL₃₀ - Canned in 30°Brix Syrup at 100°C for 30 minutes.

WH₂₀ - Canned in 40°Brix Syrup at 100°C for 20 minutes.

WH₃₀ - Canned in 40°Brix Syrup at 100°C for 30 minutes.

Average of ten cans

TABLE - 3 Physico-Chemical Examination of Canned whole Golden apples
in 40°C Brix syrup on storage

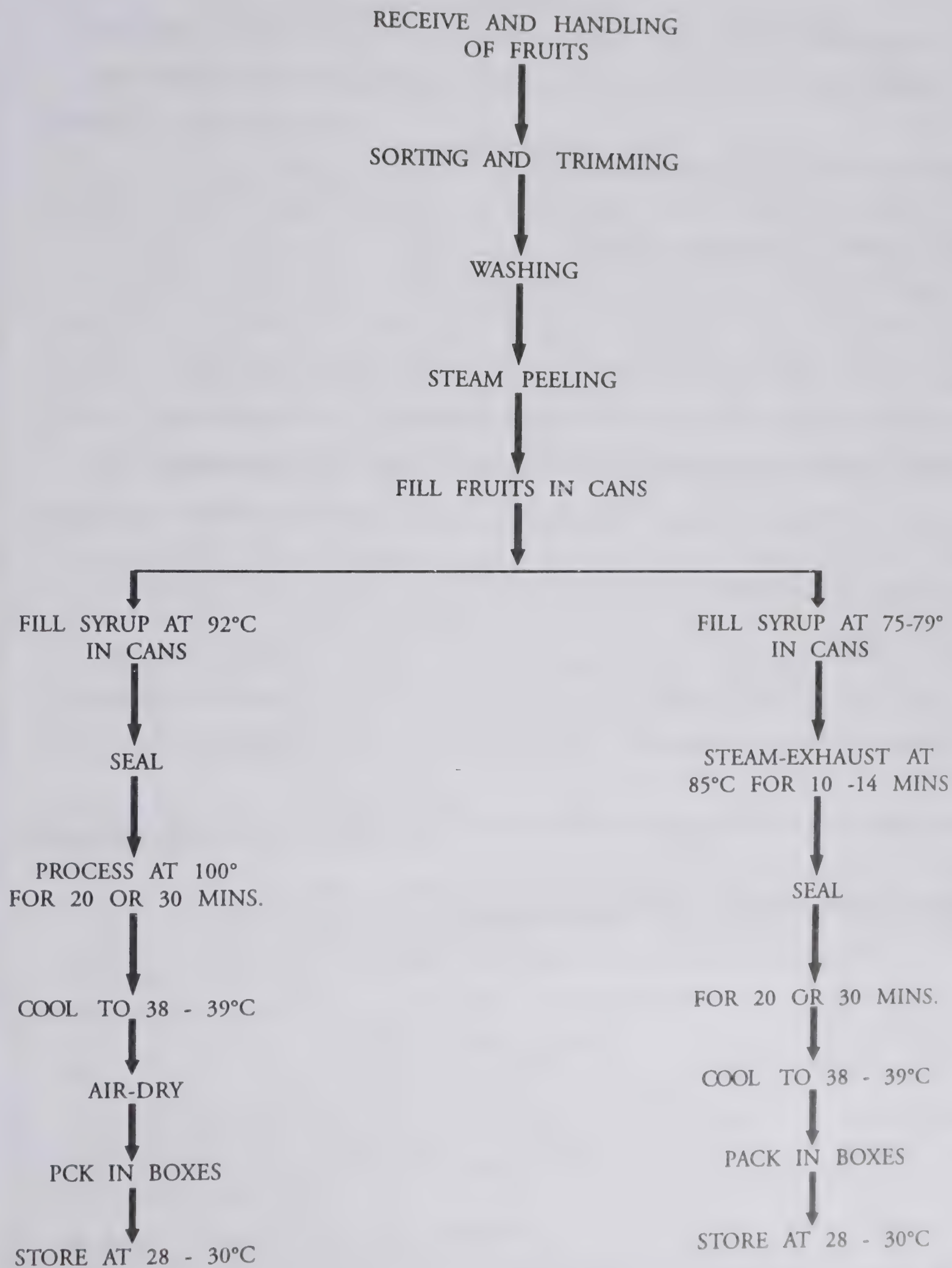
Attributes	WH ₂₀ Storage (weeks)				WH ₃₀ storage (weeks)			
	2	4	6	8	2	4	6	8
Gross wt (g)	484.5	488.0	500.0	497.0	477.0	494.5	478.0	498.0
Net wt (g)	420.5	423.5	431.9	433.9	414.5	432.5	415.0	434.8
Drain wt (g)	201.2	216.2	242.1	218.0	215.3	210.6	210.6	222.4
°Brix Syrup	29.0	28.5	28.5	28.5	27.5	28.0	28.0	28.5
Vacuum (in Hg)	12.0	12.0	12.0	14.0	13.0	13.0	13.0	15.0
Headspace (cm)	1.0	1.3	1.0	1.0	1.1	1.1	1.1	1.2
PH Syrup	3.4	3.4	3.5	3.5	3.5	3.5	3.5	3.6
Titratable Acidity, % Malic Acid	0.41	0.42	0.41	0.41	0.41	0.41	0.39	0.41

Cans were steam exhausted at 85°C for 12-14 minutes, followed by hot-water processing.

WH₂₀ Fruits canned in 40°Brix sucrose syrup hot-water processed at 100°C for 20 min.

WH₃₀ Fruits canned in 40°Brix sucrose syrup and hot-water processed at 100°C for 30 min.

Fig. 1. PROCESSING STEPS FOR CANNING WHOLE GOLDEN APPLES



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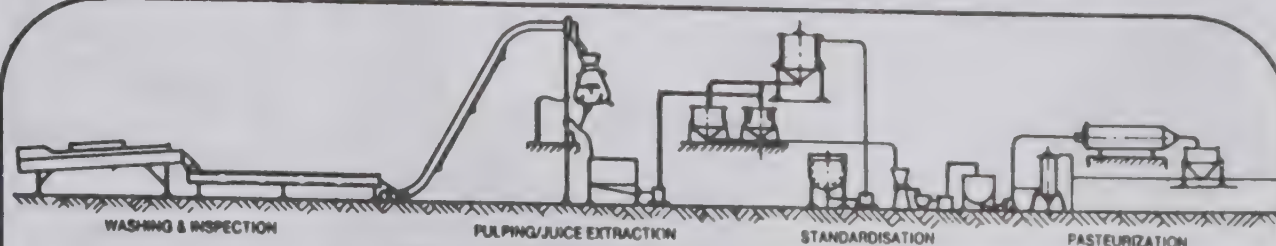
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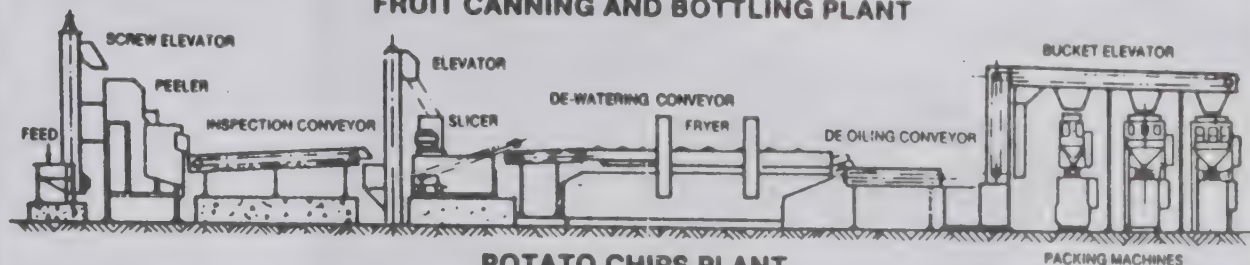
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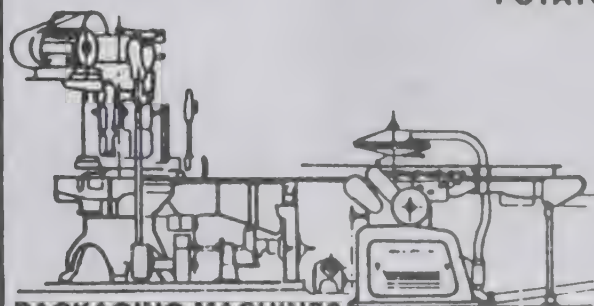
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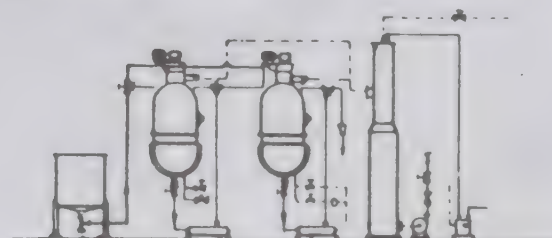


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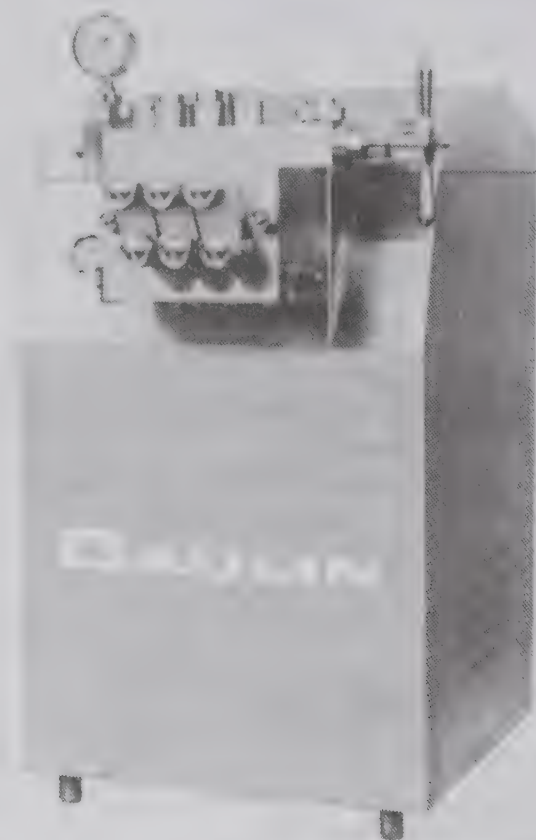


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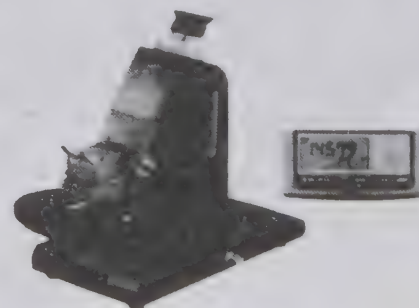
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The Convention is aimed at providing a forum for interchange of ideas among academia, industry professionals and policy makers concerned with food packaging in order to set an enabling environment for the much needed quantum jumps to effectively meet the challenges of the new century.

ICFOST-2000 will have technical sessions on the focal theme with invited oral presentations by eminent experts in the food packaging area. The Convention will also hold poster sessions wherein papers based on original research work in all areas of food science and technology will be presented by various researchers.

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There will be a special video conferencing session. Eminent speakers who will not be able to present in the convention will interact with the participants through video conferencing.

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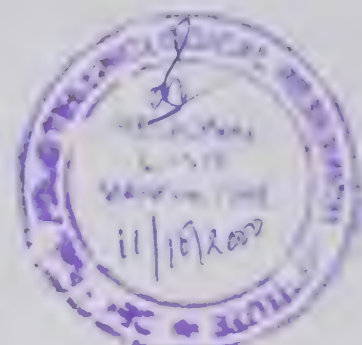
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"Success Achieved"

Hon'ble Prime Minister Shri Atal Behari Vajpayee announced in a small scale industries meet at Vigyan Bhawan that the excise duty exemption limit has been raised from Rs. 50 lacs to Rs. 1 Crore. This was the major issue pursued by the AIFPA at all forums during the last few years. Mrs. Vasundhara Raje, Minister of State for Small Scale Industries, Agro and Rural Industries was very presuasive to get the limit raised to 1 crore and for the task achieved she needs to be congratulated.

AIFPA efforts with the Deptt. of Food Processing Industries, Planning Commission and PMO' office have borne fruit. This exemption will improve the performance of the SSI units in Food Processing Industries so far facing sickness and recording a decline by about 10 percent in overall achievements.

This effective step was overdue since the first increase was made in 1998 from 30 lakhs to Rs. 50 lakhs.

We hope the notification from Finance Ministry will soon be available.

PM's assurance that a group will look into the problems of SSI units and give within three months the recommendations to streamline inspections, repeal of laws and regulations applicable to this sector since many have become redundant was a welcome announcement.

Another announcement of importance was to continue granting Rs. 75,000 to each unit that obtain ISO 9000 certification.

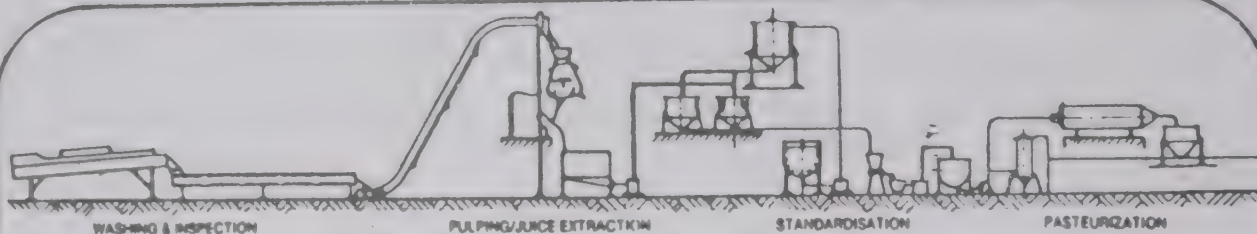
Associations have also a role to play in setting up and operating testing laboratories of international standards for creating testing facilities. The decision to give one time 50% capital grants is a positive motivation. SSI Minister's announcements to launch a credit guarantee scheme with a corpus fund of Rs. 125 crore is a major step to make available finances to the SSI units.

These are positive and encouraging steps in the right direction to make SSI units competitive and a strength to the national economy.

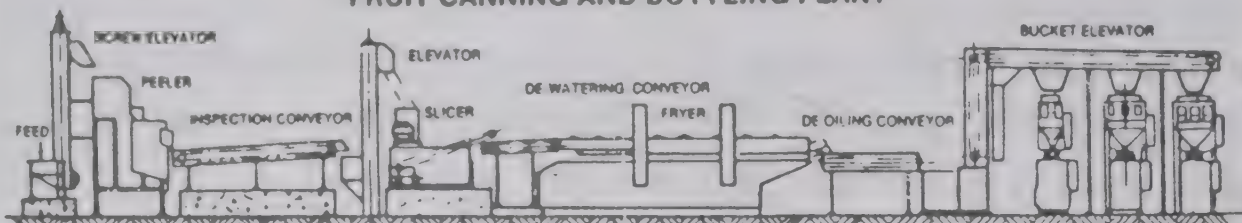
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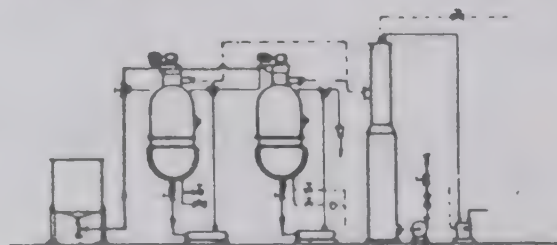
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HIGHLIGHTS

Visit of German Delegates
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ASSOCIATION NEWS

Conference on Biotechnological Strategies in Agro Processing 9-11th February, 2000.

Recommendations.

1. The technologies emerging through biotechnological route have to be merged with conventional knowledge of plant breeding to realize maximum gain. It is essential to increase the productivity in a sustainable and evolutionary acceptable manner. The existing plateau in yield of rice, wheat, sugarcane and cotton crops can be overcome by exploiting heterosis, new plant types and reducing biotic and abiotic stresses through biotechnological techniques especially alien genes, apimictic gene, and thermosensitive male sterility. Biotechnology also needs to be used extensively to enhance quality of rice and wheat grains by engineering genes for these traits across the reproduction barriers.

(Action : ICAR; DBT, GOI; Research Institutions).

2. Before initiating any programme anywhere in the country in the area of transgenic, protocols for marker aided selection (MAS) and research in this field should be developed. For improvement of specific traits through transgenic, besides availability of protocol for gene transfer and expression of desired gene in new backgrounds, its economic and commercial

viability, public response and other aspects related with intellectual property rights should be thoroughly considered.

The introduction of transgenic plants developed by international institutions such as, International Rice Research Institute (IRRI) and International Centre for Wheat and Maize Improvement (CIMMYT), appropriate for various agricultural states of India should be introduced expeditiously while adopting national regulatory procedures for their direct use.

(Action : DBT, GOI; Research Institutions; Ministry of Environment and Forests (MoEF), GOI; State Agricultural Departments; ICAR).

3. A step by step and case by case risk assessment of genetically modified materials is desirable. The mechanisms for ensuring compliance of biosafety guidelines through institutional, state and national level committees need to be seriously reconsidered and the constitution of these committees need to be suitably amended as the Committees suggested in these guidelines by the Ministry of Environment & Forests, GOI would not be technically and legally equipped to ensure effective enforcement.

There is a need to reduce the procedural delay in obtaining permission for testing of genetically modified organisms and products for commercial use.

(Action; DBT, GOI; Ministry of Environment and Forests, GOI)

4. There is a strong need to encourage the use of biofertilizers and bio - organic manures or integrated plant nutrient management. The use of biopesticides, natural plant products effective against agricultural pests and the efficacy of Bt gene needs to be demonstrated as a strong component of integrated pest management programme.

In order to promote the extensive application of biofertilizers and bio - pesticides, there is an urgent need to provide quality control mechanisms for regulating the quality of such products being marketed in the private sector. One such step in this direction could be the inclusion of biofertilizers under Fertilizer (Control) Order.

(Action : Ministry of Agriculture, GOI; State Departments of Agriculture; ICAR; DBT, GOI).

5. In the area of agro processing, research on improved post harvest quality such as uniformity in size, shape, fruit firmness and enhanced shelf life is needed. Also the genes involved in biosenescence need to be isolated. Cloned and utilized for delaying senescence, food maturity and increasing the shelf life of fruits & vegetables and changing the plant architecture. The enzymatic removal of bitterness of citrus fruits also needs to be taken up.

(Action : Ministry of Food Processing Industries, GOI; DBT, GOI)

6. In the present scenario where cold storage facilities are expensive, India should opt for preservation technologies which are cost effective and environmentally safe. The modified/controlled atmosphere packaging already being under commercial application throughout the world may be adopted and modified as per Indian conditions to minimize losses of fresh fruits and vegetables. The use of irradiation technology for preservation needs to be adopted in order to meet the international quality requirements.

(Action : Ministry of Food Processing Industries, GOI; DBT, GOI)

7. Biotechnology based rapid, precise and reproducible diagnostic assays need to be developed for the assessment of quality and safety of raw materials, processed foods and agro-products

(Action : Bureau of Indian Standards (BIS); Other Safety and Standardization Institutions)

8. Biotechnology needs to be used to domesticate and characterize the medicinal and aromatic plants in order to increase the export potential of important bio-chemical products of plant origin.

(Action : DBT, GOI; ICAR)

9. In view of unique importance of biotechnology in the light of WTO Regime coming into force by 2005 on the production and trade of biotechnology products, general patent information cells set up by small organizations need to have separate biotechnology patent service cells because of entirely specific patent regulations applicable to biotechnological products and processes.

(Action : DBT, GOI; State Councils for Science and Technology; AIBA).

10. There is a strong need to make the public aware of biotech products and complete transparency is required regarding commercialization of genetically modified crops/products and the transgenic foods need to be labeled.

(Action: State Science & Technology Councils; DBT, GOI; AIBA; Research Institutions).



HACCP

As per our original meeting of March, 2000 on HACCP One of our Member M/s Harsad Mango Products, Netrang, dist. Bharuch, has applied for the HACCP program with QAS Mumbai and succeeded in getting the final Certificate for HACCP, on 8th Aug. 2000.

During July, 2000 we had a visit of Dr. Anandvally, FAO Rep. of India in vadodra in collaboration with APEDA, and conducted Preliminary inspection of Seven Units, engaged in Mfg. of Pickles, Pastes, Canned Fruit pulp & Juices. All these seven units are interested in having the HACCP certification and the preliminary inspection report by FAO Rep. were sent to APEDA for final consideration.

All these units are implementing this certification system based on our quality awareness Program. These units are getting Financial assistance from APEDA under their Quality Assurance Scheme.

Out of total seven unit, one unit is taking ISO 9002 Certification also and all the related documents of that unit are ready for first audit. The audit has been scheduled by the Certifying agency on 7th Sep. 2000.



Minutes of the "North Zone, "Taxation" and "Panel of Experts" Meetings held on 04.08.2000 in CDC, Board Room of India Habitat Centre, Lodhi Road, New Delhi.

Sh. J.S. Srivastava, Chairman, North Zone Chaired the meeting.

Attendance Sheet is enclosed.

Item No. 1. Sh. J.S. Srivastava Welcomed the members.

Item No. 2. Discussion on matters related to PFA, MFPI and BIS.

The listed issues were taken up by Sh. P.S. Dhillon, Chairman, Panel of Experts.

(a) PFA Notification :

(i) Draft notification No. GSR 464(E) dated 17.05.2000 regarding standards of malt based foods was deliberated and the provisions were taken as suitable for the implementation by the industry.

(ii) Association recommendations sent to PFA authorities vide letter No. 371/2000/1268 dated 11.07.2000 were noted by the members on the Draft Notification No. GSR 354(E) dated 26.04.2000 regarding use of sucralose in carbonated water.

(iii) Notification No. 537(E) dated 13.06.2000 regarding "Best Before rule and its implementation w.e.f. 1st Sept., 2000 was noted.

(iv) Notification No. GSR 501(E) dated 29.09.2000 regarding milk powder was noted by the members.

(v) Use of Processing Aids in food was considered to be an on going process. It was decided that the procedure to import food stuffs must be streamlined so that no violation of PFA may be allowed. The industries may put forth their proposals to use food additives which are listed in the Codex and permitted in the food stuffs imported into India. Suggestions were given that the negative list may be drawn for processing aids which should not be allowed. Codex and labelling guide lines must be uniform. All the association should have uniformity in recommendations. There should be testing facilities for the imported food stuffs.

(b) Department of Food Processing Industries

(i) Formulation of India's Stand on the issues of Market access, domestic support and export subsidy commitments under WTO agreements, it was decided that an in-depth study may be made on the issues of WTO along-with FICCI and CII and our views may be incorporated in their recommendations to the Government.

(ii) "Development of a Diagnostic Tool for Quick Productivity Appraisal (QPA) in Fruit and Vegetable Processing Industries".

This report has been prepared by NPC Panel members were requested to send their views so that the paper on QPA may be a useful policy decision by the Department of Food Processing Industries.

(iii) National Policy on Food Processing Industries - Papers received from Department of Food Processing Industries for Industry comments.

Members were requested that they must give inputs to formulate a national policy on Food Processing Industries. It was therefore an urgency to send our comments. The national policy must be aggressive and pointed towards growth. Shri Dhillon said that recommendations about manufacturing adopted in the task force must be adopted.

(c) BIS Notifications:

(a) Methods for Determination of Synthetic : Pyrethroids in Agril & Food Commodities.

(b) Methods for Determination of Phorate Residues in Agril. and Food Commodities, Soil and Water.

2. Method for Determination of Paraquat Residues in Agril. and Food Commodities, Soil and Water.

3. Draft specifications for Cocoa Beans, Cocoa Beans - Cut test, Cocoa Beans - Determination of moisture content (Routine Test)

The above notification's were noted by the members. It was pointed out that on BIS food committees our members must represent before BIS standards are finalised.

Item No. 3. Corporate membership and raising of resources for furthering the activities of the association.

A list of the potential members from the industry for corporate membership was discussed and it was decided Sh. Kejriwal, Sh. Patnaik will meet shortly and try to enrol members in this category to make funding position sound for the association activities. It was also suggested that an appeal may be printed in Indian Food Packer for life and corporate membership.

Item No. 4. Setting up of a Food Testing Laboratory in Delhi.

President informed that a letter for allocation of land for setting up a Food Testing Laboratory at Delhi has been sent to Lt. Governor of Delhi. He constituted a Committee consisting of Sh. J.S.Srivastava, Dr. S. Jindal And Sh. B.L. Kapoor to pursue this matter and execute this programme. Accreditation of the lab should be taken from NABL.

President requested the committee to report the progress within 60 days.

Item No. 5. List of Outstanding dues for collection from North Zone Members.

It was decided that Sh. J.S. Srivastava along with influential members like Dr. Naik Kurade, Sh.B.L. Kapoor will take up in the next week with each party to settle their outstandings and request them to be regular in paying the dues of the association for better services.

Item No. 6 Briefing by Dr. S.Jindal about various issues faced by North Zone Industries. Views of members are requested for suitable action.

Dr. S. Jindal, Vice-President briefed the members that the Food Industry is facing crises situation on account of difficult situation created on account of pollution control issues. In fact the situation has become alarmig not only due to causes attributed to the industry but seriously due to delayed actions by the Pollution Control Board and pressure from the Supreme Court judgement. Pollution control measures, classified into different categories such as green category or orange category needs food processing industries to be placed in favourable category due to its character.

In addition, the following issues were brought out by the members.

- i) The Food Processing Industry has declined very seriously during the last few years. Estimated fall is around 10 per cent.
- ii) The Department of Food Processing Industries is very keen to see the growth in this sector but on account of some of the issues connected with the taxation policy are very serious obstacles. The Central Excise Duty has been just

doubled when the same was required to be as low as 0% on processed food stuffs. Similarly the State Taxes and Central Sales Tax has been irrationally hiked on processed food products. There was a need for raising limits for SSI Units.

iii) Foreign brand products in India are seriously affecting the markets of the local industries. Almost all products imported do not conform to PFA standards in formulations and labelling requirements.

iv) Constraints of availability of processing varieties of raw materials, pesticide residues in agriculture and horticulture produce used for processed foods and availability of testing facilities are still a constraint.

v) Need for rationalisation of food laws is extremely important due to seriousness of punishments even for violations not under the Control of the industry.

Members were concerned about many developments after liberalisation and lack of development of parallel techniques and modules.

Item No. 7. Strategy to be decided for the next years' Union Budget

Dr. S. Jindal brought out that the steps have to be taken to streamline taxation policy of the government during 2001-2002 budget proposals.

In fact we have to concentrate on;

- a) Reduction of Central Excise Duty at Zero level.
- b) Abatement on MRP has to be at the level of 60% since existing level of 30% is very insufficient

and industry has to pay taxes out of their own input costs.

c) VAT, if introduced this year should include all taxes but at level of zero duty and not as high a duty as 16% introduced by default in Cenvat systems.

President attached great importance to budgetary requirement for the growth of the industry.

He wanted that the fact and figures (Data) may be compiled and budget representations may be sent to all the important functionaries in the Government to create a realisation that this industry is a key factor for the Growth of GDP and high foreign exchange earner. This is the only industry which can give income to the rural poor.

It was decided that :

- a) To prepare a fact sheet of industry's which estimated to be declined around 10% plus.
- b) Letters to important MPs and important Ministers may be sent highlighting that there is a overall wastage of around 40% in F&V produce as also acknowledged by the Prime Minister in his interview with village Sarpanch' on 04.08.2000 on DD net work and as such to save this wastage by processing will in itself save crores of rupees.

Letters may specially be sent to Shri Chandra Babu Naidu, Ms. Mamta Banerjee, Sh. Sharad Pawar, Sh. Jagjit Barar Sh. Ram Vilas Paswan, Sh. Nitish Kumar, Sh. Balram Jhakar and in Prime Minister's office, Sh. D. Kulkarni (Adviser), Sh. Promod Mahajan

and Sh. Arun Shaurie etc.

c) To sponsor articles in important newspapers particularly financial papers.

d) Budget proposal for Zero duty from soil to product as Harvesting, growing and processing is an integrated activity.

e) It was proposed that the Zonal and Chapter Chairman should take up budget proposals through their local M.Ps and the State Chief Ministers. Particularly South Zone should aggressively take up these issue.

President pointed out that the policy of unrestricted import of food stuffs must be stopped. Local manufactured goods should also be strictly monitored.

Item No. 8. Any other item.

Members were of the strong views on the following issues.

a) The food laws must be rationalised at the earliest. There

was a need for grading of the offences.

b) DDT, PHC must be banned to control pesticides residues in the raw materials.

The meeting ended with thanks to the Chair. Members were invited for tea & snacks by the North Zone Chairman.

(J.S. Srivastava)
North Zone Chairman

Welcome address of Sh. J.S. Srivastava North Zone, Chairman.

I welcome you to this meeting of the North Zone Council of the Association. In today's meeting we have Panel of experts to discuss issues connected with PFA, Policies issues received from Department of Food Processing Industries and BIS Standards.

You are aware that we are in a transition stage when old order is changing over to 'New'. Large

quantities of Foreign Processed Food Stuffs have been opened to be sold in India. We have also WTO coming in to regulate the World Trading Order. We are signatureis to that and will have no escape route.

Slowly Indian Industry has also started adoping improvised techniques of packaging and Marketing. We are confident of upgradation of processing technology. Let us not fear from domestic and International Competition. We have the capabilities of handling the toughest on any front. The business rules have got to be the same and playing field should be smooth for all the parties. That is the effort which we should all make.

I will not take more of your time since the agenda is heavy and decisions are urgent.

I welcome you once again and request you to take up discussion matters.

NEWS ROUND UP

Britannia net up 37% to Rs 51 cr

Foods major Britannia Industries today reported a 37 per cent growth in net profit to Rs. 51 crore for the year ended March '00 against the previous year's Rs.39 crore. Sales for the same period grew by 14 per cent at Rs. 1,170 crore from the previous year's Rs. 1,030 crore. Interest burden during the year was Rs. 7 crore against Rs. 6 crore in the previous year. Depreciation was placed at Rs. 17 crore against Rs. 16 crore last year. Exceptional item (proportionate VRS cost) amounted to around Rs. 2 crore during the year.

According to an official release, corporate sales grew following satisfactory performance by the company's bakery and new dairy operations. Biscuit volumes grew by 15 per cent with the help of new launches like Good Morning biscuits under the Nutrchoice umbrella, Vita Marie Gold and Tiger variants in the medium and mass market segments. Britannia also entered the ghee market during the year and introduced Milkman as an umbrella brand for its dairy range of products.

NUMBER CRUCHING

	Year Ended March	
	2000	1999
Net Sales	1,169	1,030

PBT	79	57
Net Profit	51	40
Equity	28	19

The company had incurred a capital expenditure of Rs. 12 crore to upgrade its manufacturing facilities, focusing on new products and modern packing systems.

Meanwhile, the company is constantly working on redefining and repositioning its products recently, identifying health as a critical link to touch the Indian consumer. Projecting itself as a 'snack food' company, Britannia has aggressively chalked out a strategy to become either a number one or number two player in the youth snacks category. It had recently consolidated its dairy business and currently claims a 35 per cent share in the cheese market.

The Economic Times 31.05.2000



15% FDI inflow in Food Processing in 9 years

The Foreign Direct Investment (FDI) inflow was a mere 15 per cent of the total proposed Rs. 53,736 crores in the country's food processing sector in the nine-year period till December 1999.

Senior officials of the Department of Food Processing Industries (DFPI) said FDI was only Rs. 9,100 crores during this period. They attributed the main reason for this due to lack of enthusiasm to minuscule proportion of processed foods in the country's consumption habits.

"India processes only 1.8-2 per cent of the food produced and processed food is even considered unhealthy and unhygienic," they said adding this perception stymied the fruition of proposals into actual investment.

Another major reason for the failure of proposed FDI to actually come into the country was repeated withdrawals of Indian partners in the case of joint ventures, the officials said.

Of proposals worth Rs. 53,736 crores received from July 1991 to December 1999 for 5,875 food processing projects, only 673 with an investment of Rs. 7,517 crores had been implemented.

The largest number of 405 proposals were received in the fruit and vegetable products category for setting up 100 per cent export-oriented units with an investment worth Rs. 5,026 crores, as per the annual report of the DFPI. Next was the fermentation industry with 211

proposals promising investment worth Rs. 2,073 crores, it said.

Topping the list of total proposals (both domestic and foreign investment) was again the fruit and vegetable products category with 1,808 proposals worth Rs. 8,282 crores. This was closely followed by edible oils and oilseeds category with 1,675 proposals listed for investment pledging Rs. 13,416-crore worth of investment.

The next position was taken by milk and milk products category with 1,112 proposals promising investment worth Rs. 14,705 crores, as per the report.

The dubious distinction of the lowest number of proposals was bagged by the category called others including food additives flavours etc., which attracted a mere 61 proposals worth promised investment of Rs. 733 crores only.

In the case of foreign investment, the category of consumer industry including soft drinks, confectionery and wafers attracted the highest amount of actual investment at Rs. 5,193 crores.

The Business Line 31.05.2000



Nod for setting up Food Parks in 3 States

The Government on Tuesday said it had approved setting up of food parks in at least three States and would fund up to one-third of their total costs - or roughly Rs. 4

crores in a bid to encouraging the fledgling food processing sector.

While one such park would be set up in Uttar Pradesh, the Government had approved two in West Bengal, the Department of Food Processing Industries (DFPI) officials said here, adding that the first such park was approved in Kerala earlier.

"We have approved four food parks in West Bengal and Uttar Pradesh besides Kerala for which the department has already provided Rs. 4-crore funding," they said.

These food parks would house over 30 food processing units under one roof and are designed to provide these units with basic infrastructural and other facilities to encourage processing of foods.

"The department will set up common facilities here such as cold storage chains, quality control laboratories, pollution control facilities besides water and electricity," the officials said.

The first of these parks is expected to come up in Malappuram, Kerala soon. Housing 55 food processing units, it is spread over 70 acres of land and the total project cost is estimated at Rs. 19.5 crores.

While Rs. 4 crores have been provided by the DFPI as a grant the remaining Rs. 15.5 crores have been funded by the Kerala State Industrial Development Corporation.

The department said four more such proposals had been received respectively from Punjab, Tamil Nadu, Maharashtra and Madhya Pradesh and these were being looked into.

Of the approved projects, only one of the proposed parks in West Bengal has been able to attract private sector participation.

The Business Line 31.05.2000



Food Labelling will Protect Consumer Rights

At a time when consumer is said to be king and his rights have taken centrestage, it is somewhat strange if not incongruent that certain sections of food manufacturers should oppose introduction of labelling norms for all articles of food containing non-vegetarian ingredients.

The National Egg Coordination Committee and the Poultry Federation of India have taken up cudgels against the recent amendment to the Prevention of Food Adulteration Rules that makes it mandatory for manufacturers to make a clear declaration by a symbol and colour code in the label and other information material, if the article of food contains whole or part of any animal including birds and fresh water or marine animals or eggs as an ingredient. The new regulation has been described by those affected as a retrograde step on the ground that such labelling

restriction was not followed anywhere in the world.

According to reports, poultry industry has threatened to take up the matter with higher authorities in the Government if the Ministry of Health refuses to consider their plea against the new rule.

Clearly, this is a knee-jerk reaction on the part of the food industry which feels insecure and possibly threatened that labelling would affect its sales. For all that, the industry's apprehensions may turn out to be misplaced.

But the important point is that the industry seems to have conveniently, if not deliberately, ignored the question of consumers' right to know what is on offer. Apparently, the industry is not unduly bothered about ethical issues in the food industry.

The labelling issue in case of food articles with non-vegetarian ingredients is no different from say food containing genetically modified organisms (GMOs), against which there is a strong public opinion in many countries. In many parts of the world including the European Union, labelling of food containing transgenic material is mandatory because consumers' right to know is respected.

In introducing the labelling norm, the authorities have rightly reckoned with the religious sensibilities of consumers as also the low level of literacy in the country. Food and its nature are emotive

factors among certain sections of people. More importantly, people recognise and understand symbols and images better than the written word.

The Poultry Federation of India which is opposed to labelling egg as non-vegetarian should know that it is futile to challenge the strong, long-held beliefs and convictions of consumers. The question is not whether (on scientific considerations) egg is non-vegetarian or not, but what the consumers believe it to be. The Indian consumer believes that milk and honey are not non-vegetarian and this belief continues since times immemorial. The same cannot be said of meat, marine food and even egg.

By mandating the labelling of food containing non-vegetarian ingredients the authorities have sought to respect and indeed enhance consumer rights and have enabled the consumer to take an informed decision. There is nothing in the new amendment that would suggest that non-vegetarian food is inferior.

The Government's stand deserves to be supported by consumer organisations. The poultry industry is dependent on consumers for survival and must learn to respect their rights. Business ethics and social responsibilities must inform sections of the food industry.

The Business Line 31.05.2000



Comments invited on use of sucralose

The government has issued a draft notification inviting comments of the public on its proposal to allow the use of sucralose, an artificial sweetener, as a table-top sweetener and in carbonated drinks by amending the provisions in the Prevention of Food Adulteration Rules, 1955.

According to sources in the Ministry of Health and Family Welfare, the PFA rules allow the use of three artificial sweeteners in carbonated drinks and as table-top sweeteners. These are saccharine, aspartame and acesulfame K. The use of aspartame and acesulfame K in fixed proportion in carbonated drinks is permitted.

The proposal seeks to add sucralose to the list of permitted artificial sweeteners and allow its use in carbonated drinks and as table-top sweetener with suitable label declaration.

Comments or objections on the proposed amendment may be sent to Secretary, Department of Health, Nirman Bhavan by June end.

The Business Line 01.06.2000



Phillip Morris Arm in India for Processed Food

Phillip Morris has set up a new company in India, KJS India Ltd. to undertake manufacturing of its

agro-based processed food, which includes cheese, confectionery and chocolates.

KJS India is a wholly-owned step down venture of Phillip Morris India Pvt.Ltd. (PMIPL), the latter being a wholly - owned investment vehicle already having Government permission to set up downstream ventures for the purpose, sources said.

PMIPL's revised paid-up capital, comprising 100 per cent FDI component from Phillip Morris, also the world's largest cigarette manufacturer with a 17 per cent marketshare, is Rs. 70 crores. All except one share - which is in the name of B.Muratti Sons & Co. - is held by Phillip Morris overseas Investment Corporation.

However, the Government approval granted to Phillip Morris for venturing the agro-based food business in the country was subject to the condition that the 100 per cent subsidiary, PMIPL, be permitted to undertake activities of only a holding company. Prior and specific approval of the Government and the Foreign Investment Promotion Board (FIPB) would be required for setting up joint ventures or down-stream units.

As per the foreign collaboration agreement entered into by the company. PMILP had also proposed to undertake 'manufacturing' activity through a wholly-owned subsidiary. Hence, the need to set up KJS India. PMILP will subscribe to the entire

equity capital of the new venture. the sources told Business Line.

As per the original proposal, Phillip Morris would establish a wholly-owned subsidiary PMIPL, for the purpose of establishing ventures in India, principally in the areas of agro-based food processing including pasta, vegetable/puree/paste/sauce/cheese, processed powdered foods and beverage products, cereals, etc.

The extensive list also includes yeast-based food supplement, quick-cook foodgrains, salad dressings, mayonnaise and other types of spreads, cream cheese, cottage cheese, rice, confectionery (chocolate and toffees), coffee, diary products including yogurt, sour cream, processed meats, frozen and or ready to eat and dry desserts, snack foods pizza, condiments and other food-based grocery products.

The Business Line 01.06.2000



Liquor Maker Kicks Off Food Site

A Web site on food, www.foodiezone.com, was recently launched by liquor baron, Mr. Rocky Mohan.

The site has been set up in partnership with advertising professional, Mr. Gurinder Singh and software specialist, Mr. Praveen Joneja.

Though the portal is at present only Delhi-centric, other cities will be added in the next few months.

The site offeres restaurants with varied culsines along with the facility to place an order. It also has special recipes.

Anyone can get registered as a user. After checking out details through eight sections of eating houses in different areas and selecting one, one can also find out the cost of the dishes.

The web site lists expensive, five-star, medium, low cost restaurants and also those which serve liquor.

The site also has details of the discotheues in town.

In addition, there are a list of food festivals in different hotels and details of what the eating joints look like.

For the health conscious, there is a guide to healthy eating, apart from details on beating hangovers.

There is no charge for registering or ordering via the Web site.

The Business Line 01.06.2000



CM calls for focus on Food Processing

Chief Minister N. Chandrababu Naidu on Wednesday called upon the corporate giants to come forward to develop food processing industry, particularly horticulture-related units, in the state to pave way for achieving the objectives set in the Vision-2020 document.

Naidu was inaugurating a one-day strategy seminar on 'Food

processing in Andhra Pradesh' hosted by the industries and commerce department of the state government in association with the AP Industrial and Technical Consultancy Organisation (Apitco) here. He said that his government had arranged for the corporate companies to have direct link with self-help groups like the water users' associations and watershed committees for contract farming.

Similarly, cooperative farming would also be encouraged. Pointing out the backwardness of the state in food processing area and the heavy percentage of losses incurred in the post harvesting and processing, the chief minister sought the cooperation of the corporate giants in overcoming the problem. He assured that the government would extend its support if the corporate organisations come forward with proposals.

He said that his government was committee to accord top priority in developing horticulture sector. Saying that the new agriculture policy would be announced very shortly, the chief minister said that the government had decided to impart training to all the farmers under the policy.

He said that the new policy would envisage the concept of "low input and high yield with judicious use of the resources."

The Business Line 01.06.2000



Timblos sell bottling rights to Jaipurias

With three-month long deliberations bearing fruit, the Timblos have decided to sell their bottling plants and marketing operations of Pepsi in entire Goa and the 10 neighbouring districts of Maharashtra and Karnataka to Delhi-based Jaipuria brothers.

The deal has reportedly been struck for over Rs. 60 crore, sources said. Mr. Prashant Timblo the CMD of the company, however could not be contacted.

Though the actual shift would take place only in the second week of June, officials of Jaipurias - a Pepsi franchise operator running around 11 bottling plants in India and Nepal - are already in the market here.

Timblos, who own a leading mining firm Fomento and Goa's famous five star resort Cidade de Goa at Dona Paula near Panaji, operate Goa Bottling Company with an annual production capacity of 3.5 million cases in Goa and Nectar Beverages Ltd in Dharwar, bottling three million cases annually.

Besides Goa, which is having second highest per capita soft drink consumption rate in India, the Timblos were also marketing the 'blue' products in Sindhudurg, Ratnagiri and Kolhapur districts of Maharashtra and Dharwar, Chitradurg, Davengiri, Bijapur, Hospet, Bellary and North Canara districts of Karnataka.

PepsiCo is learnt to have allotted to the Jaipurias two more districts of Karnataka - Hubli and Gadag. Incidentally, the Timblos had broken away from their franchise deal with Coca Cola three years ago, countering, the attempt made by the Atlanta-based multinational to take over their bottling plant.

The Pioneer

01.06.2000



AP panel spots thrust areas

Only two per cent of the total vegetables produced in Andhra Pradesh are processed and the remaining 98 per cent are consumed as fresh seasonal vegetables. Similarly, over 90 per cent of fruits and 85 per cent of the tamarind produced are consumed directly.

Even in the case of chillies, only 25 per cent of the red chillies produced are converted into chilli powder and oleoresins. In contrast, more than 90 per cent of the tapioca produced in the State are utilised by the processing industries.

These are some of the findings of the core committee constituted by the State Government to discuss and identify key issues for evolving policy initiatives for the development of horticulture and processing industries in Andhra Pradesh.

The committee, which made a study of the food processing industry in Andhra Pradesh as well as in Maharashtra, Kerala, Karnataka, Tamil Nadu and Himachal Pradesh,

recently submitted its report to the Government.

The report, prepared by Andhra Pradesh Industrial and Technical Consultancy Organisation Ltd. (APITCO), suggested to the Government to encourage private initiative, educate farmers and support planned market development to ensure the development of horticulture in the State.

As per the figures provided by the State Horticultuer Department, there was a decline in the production and yield of mango, citrus, sapota and grapes between 1995-96 and 1998-99 though the area under cultivation had either increased or remained the same.

During the three-year period the area under mango increased from 2.64 lakh hectares to 2.82 lakh ha., but the production had declined from 31.64 lakh tonnes to 18.77 lakh tonnes. The yield per hectare had declined from 12 tonnes per ha. to 6.7 tonnes per ha.

Similarly, the production of citrus decreased from 9.43 lakh tonnes to 6.08 lakh tonnes, while its per hectare yield declined from 15 tonnes to 8.6 tonnes. The per hectare yield of sapota had declined from 13.3 tonnes to 11.4 tonnes and that of grapes from 23 tonnes to 15.5 tonnes.

On the other hand, there was a phenomenal increase in the yield of papaya. The yield had gone up from

58 tonnes per ha. in 1995-96 to 216 tonnes per ha. in 1998-99.

Consequently, the fruit's production in the State had gone up from 58,000 tonnes to 2.16 lakh tonnes though the area under the crop remained the same at 1,000 ha.

Even with regard to vegetables, there had been a marked decline in the yields of tomato onions, brinjals during the three year period.

The decline in the yield per hectare of tomato was from 9.9 tonnes to 6.2 tonnes, onions from 25 tonnes to 15.4 tonnes, brinjals from 20 tonnes to 14.2 tonnes and bhendi from 8.1 to 6.7 tonnes.

The thrust areas for policy initiatives identified by the core committee include improvement of quality of produce through contract and co-operative farming, improving the yields and minimising post-harvest losses which are as high as 17.36 per cent in mango, 20-40 per cent in banana. 40-50 per cent in papaya and 10-50 per cent in tomato.

The committee also suggested to the Government to consider fruit processing industry in the State as a seasonal industry and extend power tariff concessions. It wanted the Government to encourage development of fruit and vegetable processing clusters.

The Business Line

02.06.2000



Tropicana may source its produce locally

Tropicana, the fresh fruit juice brand, is exploring the possibilities of sourcing some of its produce from local suppliers, a process which could take up to six months, Opokua Kwapong, director (Research and Technical Services) Tropicana International, said.

Ms Kwapong, who was in Pune after looking at the Dynamix Dairy plant at Baramati, near here, said that currently they were importing fruit concentrate which was reconstituted, pasteurised and packed here. Dynamix Dairy is Tropicana's sole co-packer for India. It has sufficient capacities and the fruit juice major need not look for other partners.

"We are looking at Indian suppliers for some ingredients," she said, adding that the entire procedure of investigation and standardisation could take up to six months. Tropicana, which currently offers five fruit juices, developed the Nature Sweet flavour specifically for the Indian market. The flavour is a mixture of orange juice and white grapes and was introduced since the Indian palate requires a sweeter-than-international taste for orange juice.

"We are a pure fruit juice maker and cannot add sugar, so we added white grape juice, which is sweet," Balasubramanian, national sales manager, Tropicana Beverages Company, explained.

With the co-packer, Dynamix Dairy, located in the grape growing region of Baramati, MsKwapong said they could look at processing grapes there since there is no one doing it there. The fresh fruit juice maker is currently in a brand and market building exercise, following the week-long visit of its director, international new products and emerging markets development, Mare de Clippel.

Mr de Clippel said the major thrust currently was to educate the consumer about the product and its differentiation as a hundred per cent fruit juice, with no additives. He added that it will take them another six months before they could talk figures, since the product was launched nine months ago.

Mr. Balasubramanian pointed out that the 14 city presence of the fruit juice has been over the past nine months in a phased manner.

There are no hinedlate plans to roll out the product in more cities, he said, adding taht it could take them at least two more years before a 1.5 litre package is launched. The fruit juice is available in 250 ml and 1 litre packs, the smaller pack having been devised specially for the Indain market.

The Economic Times 01.07.2000



Nestle SA to offload 5% stake in Excelcia Foods

Swiss food giant Nestle SA has

decided to offload 5 per cent stake in Excelcia Foods to a strategic investor.

Though the name of strategic investor is not immediately known, sources indicate that it could be an Indian financial institution. Nestle had recently taken over Dabur's stake in the joint venture Excelcia Foods to take complete ownership of the biscuit manufacturing comapny. Earlier, while Dabur had a 40 per cent stake in the comapny, Nestle SA had 60 per cent stake,

According to sources, the deal is expected to be finalised shortly. They, however, could not reveal the premium at which the stake would be sold. " It should not be very high", a source pointed out.

Nestle, meanwhile, has decided to completely restructure the operations of the company. The restructuring would be both organisational as well as personnel in nature, sources pointed out.

The focus now would be on rationalising manpower and making Excelcia a "low-cost operator" by drawing from various resources available in-house in group comapny Nestle Inda.

The top management of the biscuit company has been reorganised with Jurg Stocker coming in as the new chairman and the old managing director, Richard Lister, going back to the Nestle SA, Excelcia Fods will now be under the overall control of the Nestle India chairmand and managing director Carlo Donati. Marketing under Sangita Talwr would be the only full-

fledged division in the comapny.

It is also rationalising manpower and doing away with a lot of posts in Excelcia as part of its overall focus of being a low cost operator. Synergies would be drawn from Nestle India and its distribution network. Nestle India's network would be used for selling Excelcia products thereby resulting in potential cost savings.

Excelcia will do away with posts of finance and human resources head in future and would draw from the expertise available within Nestle India. it would also utilise the experiences of Nestle India in supply chain management.

The company was originally set up in '96 as a 60"40 joint venture between Dabur India and Osem of Israel. However, Osem was soon taken over by Nestle, which insisted on acquiring a majority stake in Excelcia as well. Subsequently, Dabur reduced its holding in the comapny to 40 per cent by selling 18 lakh shares to Nestle for Rs. 10.55 crore.

Funding of its business plans, however, drove a wedge between the two partners, which ultimately resulted in Dabur filling a petition before before the Company Law Board (CLB)

The two companies subsequently reached an out-of-court settlement whereby Dabour exited from Excelcia, making Nestle the sole owner of the company

The Economic Times 01.07.2000



Fruit, vegetable processing projects

State project approval board here approved setting up of three units of fruit and vegetable processing projects costing Rs. 21.30 crore in the joint sector by Punjab Agro Industries Corporation Limited.

The unit will process around 35,000 tonne of fruits and vegetable per annum, it was officially stated. These projects will provide employment to 300 persons.

The Economic Times 01.07.2000



Centre's nod for 2 food parks

The Centre has in principle agreed to provide financial assistance for setting up two food parks in the state.

The parks, to be set up at cost of Rs. 16 crore, will provide the much-needed fillip to the food industry in the state, which has a large surplus of processable apples, mangoes and other fruits, besides vegetables. The cost of the two projects will be equally shared by the Centre and the state.

The proposal for the parks was finalised at a high-level meeting of officers headed by Mr. Umesh Sehgal, Secretary, Food Processing, Government of India and Mr. A. K. Goswami, Chief Secretary, here today.

Mr. Sehgal also sought

suggestions from the state for the new food processing policy being formulated by the Centre. He endorsed the state's view that the government should grant interest subsidy on loans raised by food processing units to improve their viability.

He also assured that the ministry would favourably consider the demand of the state-owned HPMC for grant of Rs. 25 lakh for publicity of its products. Besides, the state could also benefit from the funds available with the ministry for publicity as its generic campaigns to promote food products could take care of fruit products manufactured in the state.

The state underlined the need for granting excise duty exemption to new food processing units.

Mr. Sehgal pointed out that at present, there is a huge difference between the farm prices and consumer prices of various food and vegetable products. Moreover, 40 per cent of the fruit was wasted due to nonavailability of processing facility. In view of this, he stressed that more and more processing industries should be set up. The secretary (Horticulture) requested that the wine-based industry should be provided incentives on a par with other food-based industries.

Mr. Sehgal also met Mr. P. K. Dhumal, Chief Minister, and discussed ways and means to promote food processing activities in the state.

The Tribune

01.07.2000



Britannia to start 3 bread-manufacturing units in south

Britannia Industries is set to start bread-manufacturing factories in Kochi, Hyderabad and Chennai to tap the region's market potential, a senior company official said.

Amit Gupta, area sales manager of Britannia, told IANS that a recent survey had found that a huge market for bread existed in Kerala, Tamil Nadu and Andhra Pradesh. At present, Britannia has two bread factories in Mumbai and Delhi.

Chennai, with a population of six million people, consumes 80,000 loaves a day. Hyderabad, with a 5.5 million population, consumes 75,000 loaves and Kochi, with one million people, has a demand for 50,000 loaves a day.

However, Gupta declined to say whether his company would start new factories at these places or take over existing bread-manufacturing units. Britannia is reported to have held talks with leading units in these three states for possible takeovers.

Gupta noted that the biggest bread-manufacturing unit in the state, Modern Food Industries at Kochi, was recently taken over by Hindustan Lever. Of the total 250,000 loaves of bread consumed by Kerala daily, the Modern factory accounts for more than 100,000 loaves.

The Rajasthan Patrika 02.07.2000



Policy on food processing on anvil

The centre would soon bring a national policy on food processing, union secretary for food processing Omesh Saigal said.

The food processing ministry was contemplating to allow tax holiday, including excise and income tax, for industries to be set up in these areas, Saigal, who held a high level meeting with Himachal Chief Minister Arem Kumar Dhbutmal and other senior officers here, said.

At present there was huge difference between the farm prices and the consumer prices of food and vegetable products and nearly 40 per cent of the produce was wasted due to non-availability of processing facilities, it was highlighted in the meeting.

The state chief secretary gave details of the progress made in the area of food processing in Himachal and urged the Centre to provide liberal financial assistance to boost this industry to achieve the twin objectives of promoting the interests of farmer and generating employment.

Saigal assured to look into the request and informed that the Centre was also contemplating to provide loan at concessional rate of interest to the food processing industry.

The Rajasthan Patrika 02.07.2000



Plea for more Central aid to NE food processing units

A high level seminar organised by the Department of Food Processing Industries under the Union Ministry of Agriculture, has recommended increase in financial assistance for food processing projects in the North East from the existing ratio of 50:50 to 75:25.

The seminar held in Imphal recently also suggested provision of transport subsidy for food products from the North East.

Important among other recommendations are provision for sugar at levy prices to encourage growth of food processing units in the region, provision for sugar at levy prices to encourage growth of food processing units in the region, provision for packaging materials for food products of the region, setting up of a food processing quality central laboratory in the north-eastern region.

The seminar also highlighted the need for setting up of a Regional Food Science & Technology Training Institute (degree level) for the North-Eastern Region.

In his key note address in the seminar, Sri Omesh Saigal, Secretary, Department of Food Processing Industries emphasised the need for setting up processing units in order to arrest post harvest losses. He called upon entrepreneurs to capitalise on Government of India schemes for food processing industry.

The seminar, which was participated by experts from CFTRI, top officials of the Food Processing Department, representatives of TRIFED, APEDA, NABARD, among others, focussed on evolving a strategy to market products of the North-East.

Various speakers in the seminar highlighted the problem of marketing of agriculture and horticulture products of the landlocked North East outside the region because of the problem of transportation and communication.

Some of the speakers were of the opinion that it would be more rewarding to export products from the North East to South East Asian Countries provided the government decides to open up historical trade routes from this region to those countries.

Lack of packaging materials in this region is posing a major hurdle in growth of food processing units in this industry-starved region. The cost of production of processed food items goes up considerably in the region as the packaging materials have to be brought from outside the region.

The Newstime

02.07.2000



Mango medley

The mango season has come to an end and with it exports too will be over from the country. The exact export performance picture would be much clearer by Mid-July when

exports would come to a complete halt and data would be available.

This year exports were less due to a lower output, according to market sources. And, due to the less crop domestic prices were also on the higher side.

This year, the mangoes which arrived early in the markets had varying levels of sweetness. This was mainly because farmers at producing centres had sprayed a pesticide called 'Cultar' which had an adverse effect on the level of sweetness and the size of the mango, explains Vijay Dhoble, secretary of Fruits and Vegetable Merchants Association.

This year about four containers, each of about 12 tonnes, have been shipped out to UK, Switzerland and Hongkong.

Two private exporters along with Maharashtra State Agriculture Marketing Board (MSAMB) and Markfed have participated in export of mangoes under ITP, this year. Mr. Ratnakar Karale, a mango exporter, said, "This year domestic crop was lower in quantity and hence prices were higher."

Till last season, APEDA encouraged exports under ITP by reimbursing losses up to 50 per cent or Rs 2 lakh per exporter, depending on whichever is lower.

From this season onwards, besides public sector even private sector participated in exporting mangoes via-Controlled Atmosphere Containers (CAC) subject to

APEDA's clause of ceiling of ceiling of Rs. 2 lakh. Officials from APEDA reveal that about 7-8 companies had applied to the agency for exports of mangoes via-CAC.

Under the CAC export programme, procurement of mangoes will be from farms which have integrated pre and post harvest practices.

Explains Mr. S. Dave, general manager, Agricultural and Processed Food Products Export Development Authority (APEDA), Integrated Training Programmes (ITP) for pre harvest for farmers and post harvest for exporters in past two years has resulted in shipping out quality mangoes from the country.

Statistics available with APEDA, indicate that exports during April-August 1999 touched about 39,352 tonnes valued at Rs. 57.62 crore. Exports during 1998-99 touched 45,407 tonnes valued at Rs. 79.13 crore against 42,894 tonnes valued at Rs. 73.59 crore in 1997-1998.

This year mangoes were exported to the Middle East, Switzerland, Germany and Canada. About a fortnight ago, Pakistan, India's main competitor, has entered the international market with its variety of mango called sundari.

Varieties which are dominating the export scene are Baingapalli from Andhra Pradesh, Kesar from Aurangabad and Chause from Uttar Pradesh. The 'Chausa' variety has been in demand mainly due to its yellow colour and large size.

The Economic Times 03.07.2000



Maharashtra govt contemplates exclusive agro-export centres

The Maharashtra government is contemplating to set up a number of district-level exclusive agro-based products export centre with the techno-economic assistance from the World bank.

These centres will have all export-related facilities like air cargo freight stations, customs authority, cold storages and even refrigerated containers and necessary container freight stations (CFS), inland container depots (ICDs) banks and information technology based network, the State secretaries sources told Observer of Business and Politics on Saturday.

The State government has thought it fit to set up such centres in view of the fact that the export market has not been fully exploited for the excellent world-class agricultural produce in Maharashtra like oranges, grapes, mango, onions, garlics, molasses, cotton and even common vegetables which were in great demand in the Gulf countries, the sources pointed out.

The proposed agro-export centres will be based on the American models of such centres, like orange export centres in California, since America was the world largest agro-based exporter country the sources added.

Additionally, the State government would also work out a new and novel State-level draft-

export policy, to be approved by the Centre. Under the proposed State level export policy, the State government will not require to approach the Centre for its approval in export-related matters and decisions, the sources confided. The proposed state-level export policy will have certain inbuilt approvals of the union commerce and finance ministries as well as the directorate general of foreign trade (DGFT), all of whom will be pre-involved in this policy formation process. The policy is likely to be finalised within the next two to three months which will be forwarded to the government for approval.

The Observer

03.07.2000



Institutional support can make India leader in agri-exports

India can take a lead in the world's agri-exports market through the adoption of WTO-mandated quality norms, delicensing of food processing sector and by setting up integrated cargo handling facilities at international airports.

Stating this, the Associated Chambers of Commerce and Industry of India (Assocham) has come out with a ten-point strategy to enhance productivity, quality and improve infrastructure in order to boost India's agri-exports to touch a whopping Rs 30,000 crore-mark annually.

Expressing concern over fall in agri-exports from Rs 8,713 crore in

the period April-October 1998-99 to Rs. 7,203 crore in 1999-2000, the chamber has proposed institutional support to the sector in order to give the much-needed impetus for exports of agricultural produce.

With India's middle class estimated at 300 million people with an average income of \$ 1500 per household, there is large domestic market for agro-products, says the Assocham study.

The share of agricultural products exports in India's total exports currently stands at 19 percent. However, its growth potential is over 15 to 16 percent in the near future.

The agro-products industry in India is poised to become a hi-tech and high volume industry which would be able to supply both the domestic and world markets, says the study.

Agro-product exports from India is estimated at \$ 7,000 million today and is estimated to be over \$ 12,000 million in the year 2000. With investment reforms and complete delicensing of food processing industries, the agro business sector can draw good investments in coming years, it says.

Grant of financial assistance for improved packaging and strengthening of quality control including adoption of quality systems such as ISO 9000/HACCP for export units, establishment of heat treatment facilities for elimination of pest incubation for products

especially like mangoes has been called for in order to gain better access to the overseas markets.

It highlights a crucial need for setting up of integrated cargo handling and cold storage facilities at various international airports for handling export of perishable items. The chamber also suggests provision of soft loans for setting up of grading and processing centres, auction platforms, ripening chambers and quality testing equipment. Apart from this it also calls for providing financial assistance to exporters, growers and cooperative societies for development of infrastructural facilities such as purchase of specialised transport units, establishment of pre-cooling and cold storage facilities; integrated post-harvest handling systems.

Agri-products exports need institutional support, says the study. Institutions involved in agro-exports need to market their services so that they would be able to establish a large clientele in order to lap the marketable surplus for exports. Institutional changes are also required in marketing, finance, management, building quality, information supply and use.

In the study, Assocham also proposes on upgrading quality of agricultural exports, with the grants of air freight subsidy for export of selected fresh vegetables and fruits.

Farm exports down by Rs.1,510 cr

Despite an annual potential of Rs. 30,000 crore, agricultural exports

from India have fallen from Rs 8,712.62 crore in April-October 1998-99 to Rs. 7,202.78 crore in 1999-2000, says a paper presented by the Associated Chambers of Commerce and Industry of India (Assocham).

The chamber has noted that the share of agricultural product exports in India's total exports is 19 percent. Also, India has the potential to be one of the world's largest market for agri-products. Owing to a huge middle class, the export growth potential in the near future is over 15 to 16 percent.

With investment reforms and complete delicensing of food processing industries, the agrobusiness sector has drawn a large chunk of foreign direct investment in the last few years.

Assocham suggested a 10-point strategy to enhance production productivity and to improve quality and infrastructure to boost agri-exports.

The suggested measures include providing assistance for raising small and large nurseries for production of good quality planting material, upgrading technical know-how of the farmers through demonstration, trainings and publicity, rejuvenation of old orchards, area expansion and supply of minikits for vegetables.

The chamber has emphasised on the need for financial aid for setting up processing centres.

The Business Standard 04.07.2000



Dabur Honey now in a trendy squeeze pack

In a more concerted effort to position one of its top ten brands - Dabur Honey - on the fun plank and draw the user group-kids-directly, Dabur India has launched the product in a trendy squeeze pack priced at Rs. 78 for a 400 gm pack. The squeeze pack - launched in the top four metros only - will be promoted through advertising which will begin in the next few weeks and PoS material that communicates the fun plank with the headline play with your food with honey squeeze pack. In order to make the product appeal to the segment the company also plans to change to old staid looking labels on the packs with contemporary labels.

The Rs 40-crore brand has been repositioned twice in the last five years. In the first stage in 1994, Dabur Honey was repositioned on the food platform after the company found that the brand was perceived as medicinal sweetener. That confined the bottle to shelves, only to be brought out occasionally. So in order to move it out of the kitchen cabinet onto the dining table, Dabur repositioned Dabur Honey as a taste enhancer and altered its communication at housewives-it talked about using honey as a taste enhancer and altered its communication at housewives-it talked about using honey in lot of dishes right from salads to deserts to lemonades to chicken.

"While that effort yielded

results-the brand grew at a few year CAGR of 30 per cent - it needed to find a way to increase the width and depth of usage to continue the pace of growth." says Sunil Duggal, vice-president, sales and marketing, Dabur. Till 1993-94, the category was growing at the rate of 20 per cent, annually.

So, late last year, it decided to narrow down its target audience from housewives to kids while continuing its strategy to position honey as a food product. The aim: to grow the market by promoting target scale/frequent consumption. The results from the second stage of repositioning, says Duggal, are currently being evaluated "The real results will emerge now but the immediate challenge is to maintain the current growth rate," says Duggal.

Besides the TV advertising campaign honey khaake dekho ji-Dabur has supported the new positioning plank with various below-the line activities targeting kids. These include giving away fun freebies such as comics and animal faced masks with 200gm, 500gm and 1Kg Dabur Honey. Besides, the company has undertaken a plantation awareness programme in more than 200 schools in Delhi. As part of the project, Dabur contacted more than 55,000 children of class II and III and provided booklets and posters to them.

Dabur Honey claims to be the leader in the branded honey market with a more than 50 per cent market

share. The estimated size of the market is around Rs. 100 crore with a large unorganised sector. The brand spends about Rs. 4 crore on advertising.

The Financial Express 05.07.2000



Pernod Ricard sourcing fruits from India

Groupe pernod Ricard, a world leader in fruit preparations and reportedly the fifth largest wine and spirit producer, has commenced sourcing processed raw fruits from India and the first shipment is expected to leave the country within ten days.

Pernod Ricard's fruit sourcing business in India is likely to net \$1 million in the first year of operations. The company, which is also the leading raw material supplier for the fruit-based industry worldwide, will initially focus its sourcing operations mainly on the mango market in Maharashtra.

"Mango definitely is the most famous tropical fruit from India. But we will also be doing considerable business through sourcing bananas from the domestic market," Mr. Alber Elgrissy, Managing Director, Pernod Ricard India, told Business Line.

Papaya and litchi also find mention in Pernod Ricard's sourcing

list. "We are also looking at developing the market for some other fruits which are popular in India. We will soon have an agro-economist in the team who will scout for developing other fruit businesses as well," Mr. Elgrissy said.

The company at present, has entered into a contract arrangement with a fruit processing unit in Ratnagiri. "The processed fruit will be packaged in 10kg tins and pasteurised before it is shipped out," Mr. Elgrissy said.

He indicated possible investments to upgrade the existing fruit processing and packaging technology, keeping in tune with the development of the company's fruit sourcing business here. "The company will look at a scenario where we have cold storage facilities for peeled mangoes, sliced and frozen at minus 30 degrees C. It may come at a later stage and provided we have the necessary governmental clearance for the same," Mr. Elgrissy said.

Interestingly, mango prices are on an upward curve this year, even as the 120-odd processing units in the mango belt of Maharashtra are facing closure due to lack of access to international markets. Mr. Elgrissy said there were reports about low mango yields from certain pockets in Maharashtra which has resulted in increased prices. "But it shouldn't pose big trouble for our business," he added.

Pernod Ricard, operating out of France and home to leading Irish whiskeys, anis-based spirits and Cuban rum, entered India in 1996 by acquiring Kohlapur based United Agencies distillery.

The company was granted approval to commence its spirits business in December 1998, but waited till early 2000 to launch its spirit brands. Pernod Ricard India's liquor offerings are Tilsbury pure grain whisky and Santiago, a Cuban styled dark rum.

The Financial Express 05.07.2000



HC notes absence of licensing authority for food establishments

The Delhi High Court on Thursday took strong exception to the fact that no licensing authority has been set up even 22 years after the Prevention of Food Adulteration Department was formed here for effective implementation of provisions under the PFA Act, 1954 and PFA Rules, 1955.

"This means no one can be prosecuted under the existing law," said a division bench comprising of Chief Justice Arijit Pasayat and Justice D. K. Jain.

Delhi is the only state in the country where there is no licensing authority for the past 22 years after the setting up of the PFA Department. Thus food establishments function without

licensing control. The judges issued notices to the Ministry of Health and Family Welfare, Chief Secretary at the State Government and Director at the PFA Department.

The Hindustan Times 07.07.2000



US food industry to stand by biotechnology crops

The US food and agriculture industry is standing by biotechnology and renewing efforts to persuade consumers that to know high-tech foods is to love them.

Experts at an International Food and Agribusiness Management Association's conference in Chicago last weeks said the industry redognised that billions of dollars worth of research into engineered foods means nothing without consumer acceptance.

The comments by industry leaders follow a rising awareness in the United States of protests and questions about genetically modified crops, which have prompted consumer boycotts in Europe since last year and caused reduced plantings this year of some GM varieties such as corn and soybeans.

"Perhaps the greatest challenge we face lies not in the area of technology but in marketing," David Rowe of Dow AgroSciences, a unit of Dow Chemical Co., told a session on food technology. Agribusiness has spent only "trivial" amounts on marketing, Rowe said, compared to

the massive dollars invested in technology.

This has cost companies in consumer mistrust of genetically modified organisms (GMOs) and biotechnology, he said, adding that to make biotechnology investments pay off firms need to give more consideration to consumer needs and education.

"Difficult marketing solutions in the short term come from underfunding marketing in the last decade. The greatest challenge facing the agricultural industry lies in identifying needs that are worth the cost of the investment," Rowe said.

Consumer education has not been a top agribusiness priority in recent years, said well-known agriculture industry consultant Carole Brookins, the chairman of World Perspectives Inc.

"Until recently biotech companies and agriculture in general thought that and new technology would be accepted by consumers because it always had been in the past," Brookins said.

"They didn't realise the world had changed and that there had been a great effort to discredit large corporations and also discredit food technology by various groups."

Now some of the major players in agricultural biotechnology have banded together to put forth their message.

Seven companies and the Biotechnology Industry Organisation

in April formed the Council for Biotechnology Information. Which has developed a \$50-million, three to five-year funds. Ted McKinney, a Dow AgroSciences spokesman who has been working with the council said it wants to highlight how biotechnology can cut pesticide use, help feed the world's growing population and make foods healthier.

Lose the term 'GMO'

Also, McKinney told the conference: "Let's lose the term GMOs." He suggested using "food biotechnology" or "agricultural biotechnology" instead.

Some at the conference blamed the public schools for failing to educate consumers about science.

William Spain, Del Monte Foods' chief corporate affairs officer said consumers' increasing isolation from agriculture and food, which gets in the way of understanding a lot of the things that we are doing in the food business these days," he said.

The industry's focus on consumer education and marketing comes well after the widespread acceptance of biotechnology by farmers and grain processors. In 1999, genetically modified seeds designed to produce their own insecticides or withstand powerful new herbicides comprised 57 per cent of the US soybean crop and 29 per cent of the US corn crop, the Department of Agriculture said. E. Berry Summerour, an agricultural analyst with investment bankers Stephens Inc. said the expected

consumer suspicion of GMOs to fade in the next few years as the industry markets more consumer-friendly products such as rice with higher vitamin A content or edible vaccines. "It's going to take some of these products to get to the market without fumbling," Summerour said.

"But it (biotechnology) is going to be here, it's going to be a fact of life."

The FinancialExpress 07.07.2000



HC Seeks details of adulterated milk from private dairies

Dehi High court (HC) on Monday sought details on alleged presence of caustic soda (Sodium Hydroxide) and other foreign material in the milk supplied by some private dairies from the Union Government and government of NCT Delhi.

The HC division bench comprising of Chief Justice Arijit Passayat and Justice DK Jain, which was hearing the public interest petition (PIL) seeking direction to the government to take steps to prevent supply of synthetic milk in the capital, directed the Central Government to take steps to prevent supply of synthetic milk in the capital, directed the Central Government Standing counsel HS Phoolk and standing counsel for Delhi government to get affidavits from the concerned departments by September 4, the next date of hearing.

The bench also sought explanation from the respondents whether Para dairy was allowed to use Ministry of Agriculture seat with registration numbers on its milk products. The petitioner's counsel Sugriv Dubey filed a fresh affidavit during the hearing which claimed that sample tests of the milk being supplied by some private dairies in the city was found "positive" in respect of the presence of caustic soda and artificial sugar. In some of the milk products the fat level was found to be below the normal standard alleged the counsel Dubey who also submitted a chart on the tests.

Pioneer

26.7.2000



India seeks US investment in food processing

India wants to attract US investment to build up its food processing sector, a huge potential growth market because most Indian food is still unprocessed as Indian official told reporters.

"We are very keen on investments that bring in high technology, especially in the area of processing the cold chain and packaging, Omesh Sigal, Indian Secretary of Food Processing, said yesterday after a meeting with US Agriculture Department officials.

Saigal and Gokul Patnail, Chairman of the Confederation of Indian Industry's northern region agri-business committee, are leading

a team of seven other Indian Government and industry officials on a five day visit to the United States.

Processed foods account for less than 2 per cent of the Indian diet, compared to over 80 per cent in the United States and more than 60 per cent in China, Saigal said.

Processed foods are heavily taxed in India, which has contributed to the slow development of the sector but we are going to take care of that Saigal said, In fact, we are thinking of a tax holiday on processed food to attract foreign investment, he said.

Earlier on Monday, the Indian team met with representatives of the US food processing and frozen food industries.

Some US firms are terribly interested in helping to build up India's food processing sector, but others are interested only in commodity exports, Saigal said.

Agriculture has traditionally been one of India's more protected sectors, but that is gradually changing, he said.

India, with its cheap labour and raw materials, is well positioned to be a production base for food processing firms interested in doing business in South-east Asia and the middle-east, Saigal said.

"We are very keen to get American companies because I think they have better expertise than companies elsewhere, he said.

The team will also travel to Iowa, Chicago and San Francisco.

Another purpose of the trip is to attract US participation in an agro-technology exposition scheduled for December 1 to 5 in Chandigarh a city about 170 miles north of Delhi.

Sentinel

26.7.2000



A golden opportunity for India

During his forthcoming visit to the United States, Prime Minister Atal Bihari Vajpayee will have an unusual opportunity to promote the Indian view-point among the US leaders and policy makers on issues of mutual interest to the two nations. For the first time since Rajiv Gandhi's visit more than fifteen years ago, all eyes in America will be on a visiting Indian prime minister. Among those watching Vajpayee will be George W. Bush and Al Gore, the Republican and Democratic presidential hopefuls, respectively, as well as Bill Clinton, and the Congress.

A key area in which the prime minister must take initiative to influence the American thinking is the new WTO Round. It may be recalled that the efforts to start such a round at the third WTO Ministerial Conference in Seattle in December 2000 had collapsed in the midst of differences between the United States and European Union (EU) and between developed and developing

countries. Since then, the United States and EU have been working together to bridge their differences. On May 31, 2000, they issued a joint statement pledging to try to launch the new Round "during the course of the year". They have also stated their wish to "include the social issues of WTO agenda. At the recent G-8 summit held in Okinawa from July 21 to July 23, 2000, the major developed countries have endorsed this essential position. Therefore, it is safe to assume that the new Round will be a top priority for the next US President.

Though our own opposition to the inclusion of labour standards into the new Round in any form and of environmental standards into the WTO negotiating agenda has been well known we must denounce all demands for social and environmental clauses in the WTO as the only means to promote social and environmental agendas.

Therefore, it is of utmost importance that when Vajpayee speaks to the US Congress, he drives home the lesson that, with its long-standing democratic societies. In turn, this impasse opens the door to alliances between the latter and protectionist lobbies, which eagerly push for social and environmental clauses in the WTO as the only means to promote social and environmental agendas.

Therefore, it is of utmost importance that when Vajpayee speaks to the US Congress, he drives

home the lesson that, with its long-standing democratic tradition, India fully shares the American dream of a world without child labour, decent wages for all and the workers right to unionisation and collective bargaining. That, even as he speaks, new laws are being enacted to bring India's practice in conformity with the Child Labour Convention of the International Labour Organisation (ILO), which it has recently signed along with the United States. He should also remind the Congress that, despite very tight fiscal situations, Indian states are rapidly building new schools to move children out of labour force as well as streets into education. The state of Karnataka has even adopted a formal goal of eradicating all child labour in six years and it is only a matter of time that other states will follow suit. India boasts of a larger trade union membership than the United States. And along many dimensions, India confers more rights on the workers than the United States.

The prime minister must also remind his hosts that trade sanctions will likely hurt the cause of higher labour standards. For instance, 5 per cent of child worker currently produce goods that are exported. Trade sanctions will only move these children out of export, less pleasant, employments. Not surprisingly, instances have been reported in Bangladesh and Nepal when fears of trade sanctions led to sudden retrenchment of child

workers. Many of these children suffered a fate worse than in their original employment, some ending up in destitution and prostitution. Keeping such harmful effects of sanctions in view but recognising the need for active promotion of higher labour standards, the natural course is to delegate the task to the ILO as previously agreed by all WTO members in the Singapore Ministerial Declaration of 1996.

To underline his message, Vajpayee should christen the new Round 'Trade Liberalisation Round' and call for an agenda that focuses on promoting a more liberal trade regime in all sectors without straying into controversial, non-trade issues. Developing and developed countries, in general, and India and the United States, in particular, stand

to reap huge benefits by further opening up their markets each other. Despite much liberalisation, many developing countries, including India, continue to have high trade barriers on goods to have high trade barriers on goods exported by developed countries.

Likewise, developed countries maintain high barriers on products exported by developing countries such as textiles and clothing, fisheries, leather and agricultural products. India and provide the United States a variety of back office services at low cost via the Internet and temporary movement of natural persons. Equally, the United States can export to India financial services of all kinds including insurance and banking. Thus, the American insistence to bring labour standards

into the WTO risks large potential benefits from traditional liberalisation that has been central to the growth and poverty-alleviation experience of many countries since the Second World War.

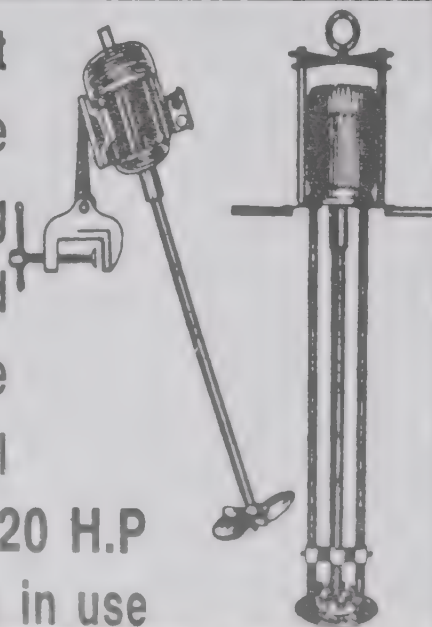
Our ministers accompanying the prime minister must complement him by reaching out to key groups, including NGOs, and explaining to them our viewpoint. Commerce minister Murasoli Maran, in particular, must also seek space in the leading US newspapers such as the Washington Post and New York Times to explain why he and his government seek a Trade Liberalisation Round at the WTO and the pursuit of labour standards at the ILO.



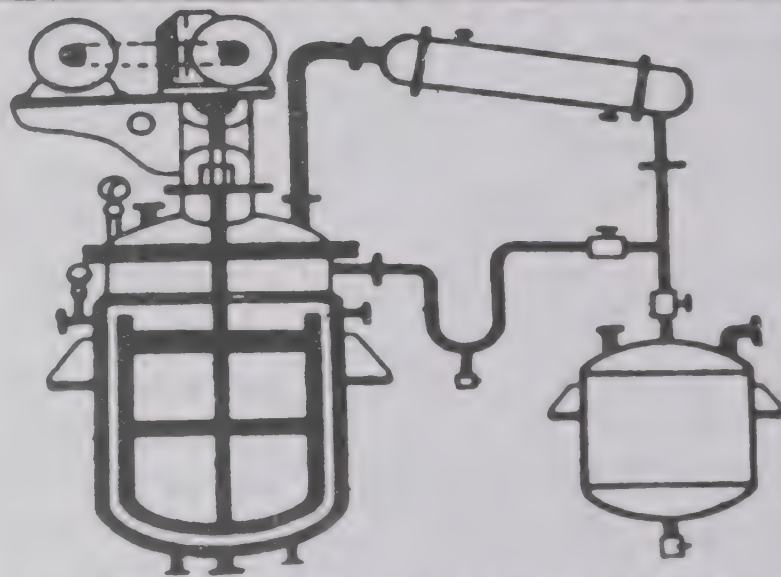
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INDUSTRY NEWS

Instant snack : Kellogg India launches Krispies Treat

Having tried its hand at the Rs 2,000 crore branded biscuits market, breakfast cereal major Kellogg India, is eyeing a brand new category in an effort to garner volumes in the Indian sub-continent.

The Michigan-based \$7-billion Kellogg Company's fully-owned Indian subsidiary, has launched 'Krispies Treat' in Bangalore early last week. Introduced in small packs priced at Rs. 3 and Rs. 5, the product is an instant snack targeted at children. The product is expected to hit retail shelves in Mumbai next month.

Even as the company is unwilling to part with details, dealers and stockists in Mumbai feel that the product will compete with chocolates in the snacking-category such as Nestle's Munch, Britannia's Chekkers and Cadbury's Perk among others.

The low price point at which Krispies Treat has been introduced will help it score against most products in the impulse-driven snacking category say analysts.

While the launch of Kellogg's Biscuits in India marked the company's first brush with biscuits globally, Krispies Treat is already a popular brand in other Kellogg's markets such as the Middle-East.

The company has been looking at alternate product categories to counter poor offtake for its breakfast cereal brands in the Indian market, say sources.

Meanwhile, the Kellogg mainstay-breakfast cereals - has seen frenzied marketing activity from the company's end. The idea behind the effort is to establish the Kellogg brand equity in the market. "The company is concentrating on establishing its brand name in the market irrespective of the offtake. The focus is entirely on being present and visible on the retail shelves with a wide range of products," explains a company dealer in Mumbai.

As per the trade, Kellogg India has disclosed to the dealers, its intention of launching more than one new product every month in the market for the next six months.

The rapid fire launches are being supported with extensive below-the-line activity. "There has been a consumer offer for every five out of ten boxes of Kellogg's cereals," informs a retailer in south Mumbai.

Among the recent introductions from the Kellogg stables are breakfast cereal brands such as Crispix banana and Crispix Chocos launched early this international favourite Kellogg's Froot Loops in March this year.

Earlier the company had launched products such as Kellogg's Cocoa Frosties, Kellogg's Honey

Crunch, Kellogg's All Barn and Kellogg's All Raisin in the Indian market.

The Financial Express 17.05.2000



Biscuit leaders hold the price lines to expand market share

Biscuits makers would love to charge that little extra for your favourite brand but thanks to good old competition, they cannot.

The reason, a host of players new and old are either jumping in or expanding into the market, all hoping it's their brand that gets dipped into the daily Indian cup of tea.

Companies like Britannia Industries' and Parle Products are already under increasing pressure to hold back price hikes and are instead focusing on increasing marketshare. The pressure is more in the glucose biscuits segment which represents 50 per cent of the total biscuits market in India.

Competition for the biscuit majors is coming from the most unexpected quarters. Like foods & health majors like Heinz, Kellogg and Smithkline Beecham who are offering biscuits extensions of their popular beverage brands like Complan (Heinz) and Horlicks (Smithkline).

From another front, chocolate majors like Cadbury and Nestle have entered the water biscuits segment with Perk and Kit Kat.

And then, back in the traditional biscuit market, regional brands like the north-based PriyaGold have aggressively begun lowpriced national launches to push volumes.

Senior Britannia Industries officials maintained their company would be extremely price competitive in an attempt to make inroads into the rural market and encourage the use of branded biscuits. "The upper class urban buyer is unlikely to let a few rupee hike worry him. Here's where a certain premium can be charged for the value offered," the official said.

Analysts agree. "The growth will be primarily coming in from the mass market i.e., the glucose biscuits segment.

Biscuits majors are keen on shifting the unbranded buyers to the branded segment. Therefore, charging a premium here would be foolhardy," said Mr. Nirav Sheth, FMCG analyst at stockbroking firm SSKI Securities.

The Economic Times 18.05.2000



Britannia Ind to launch new biscuit range, brown bread

Britannia Industries Ltd plans to introduce brown bread in the

Indian market and is looking for franchisees in the metropolitan cities, managing director Sunil K Alagh said on Friday.

The company will also launch a whole new range of biscuits by October this year. Alagh told share holders at their 81st annual general meeting in Calcutta. Britannia already makes a range of white and fruit bread and the brown bread venture will be the first by a major national outfit. Alagh said that the dairy business will also be ramped up to generate at least 20 per cent of total turnover by the end of the current fiscal against 10 per cent now.

New flavours of in the flavoured milk range will be launched by September.

Alagh said that the entire dairy range will be put under an umbrella brand. Milkman to boost its image.

Asked to comment on Britannia's diversification plans. Alagh said: 'It's out of the question for the time being. We had hoped to project Britannia as an "am to pm" brand and we have been successful in doing so.

At the moment, we are too engrossed in this to think of anything else."

Chairman Nul Wadia, replying to share-holders questions about the company's huge spending on advertising pointed out that the total adspend is only 7 per cent of total expenditure against 10 per cent by similar companies.

In the year ended March 31,

22000. Britannia spent Rs 77 crore on advertising against Rs 58 crore in the previous year.

During 1999-2000, the company reported a net profit of Rs. 51.02 crore on a turnover of Rs. 1185.7 crore, against a net of Rs. 39.55 crore and a turnover of Rs. 1043.2 crore in the previous year. Shareholders adopted the company's dividend of 45 per cent for Rs. 4.50 per equity share) amounting to a total payment of Rs. 12.5 crore.

11.8.2000



Britannia to launch lassi, coffee

Come September, Britannia Industries Ltd. will hit the market with the ready-to-drink lassi. Close on the heels of the lassi. Close on the heels of the lassi launch, Britannia will come up with instant coffee under its recently floated "Milkman" brand. The company will also enter the bakery segment with the launch of brown bread.

Disclosing this to *The Times of India* in Calcutta on Thursday, Britannia Chairman Nul Wadia said, "The move to enter the beverages segment is being made to strengthen our dairy business. Now the dairy division accounts for 10 per cent of the company's total turnover and Britannia is trying to double it to 20 per cent. We are also developing Milkman as an umbrella brand for the entire range of dairy products and beverages", said Wadia. Besides beverages, Britannia has also firmed up plans

to add more products to its existing range of cookies and biscuits. The company will also launch brown bread. According to Wadia, the new arrivals in biscuit segment will be in the Tiger range and in the premium segment. The new ranges of biscuits are expected to hit the market on by the middle of October.

Britannia is also not averse to enter into mineral water production.

Britannia is also undertaking a massive research and development exercise for developing the mass market products, packaging and the like. The company has also set its focus on cost reduction. Britannia has plans to develop nutritious snacks as well. To rationalize the power and fuel expenses which constitutes a bulk portion of inputs the company has recently employed Tata Energy Research Institute (TERI) which has already started its work.

The Economic Times 11.08.2000



Dabon launches jams and desserts

Dabon International, 50:50 dairy products JV between Dabur India and Bongrain of France, today announced the launch of Lebor, milky jam spreads and Delicia Dessert. Addressing a press conference in Delhi on Thursday,

Dabon International CEO PK Gupta said the company is launching the milky jam spread in toffee and chocolate flavoured and its Delicia Dessert would be identical to the "shrikhand" which is popular in Western India

The Economic Times 11.08.2000



Britannia plans to build brand for dairy products

Britannia Industries Ltd. (BIL) as part of its marketing strategy, has decided to give more focus on dairy products which gave a turnover of about Rs. 120 crores in 1999-2000. This being a diversified business for BIL, the management also has plans to make sizeable investments to create a brand image for its dairy products.

Responding to questions from ordinary shareholders at the company's 81st AGM here today, Mr. Nudi Wadia, BIL, chairman, said that he was aware that the domestic food products market was growing very fast.

It was, therefore, Britannia's well thought out strategy to penetrate the market with dairy products. The company in future would not hesitate to include other food items, he said.

Mr. Wadia ruled out expansion of BIL's equity capital base as also increase in its borrowing limits.

He said ; "We don't need money at the moment. The cost of ongoing expansion and modernisation programmes could be met from internal resources". The company had invested about Rs. 150 crores in the last four years in plant and machinery.

It was stated that BIL was currently operating through 30 plants, of which 23 plants were producing biscuits. "We will soon open six new centres to produce brown bread", he informed.

The company was spending seven per cent of its total expenditure on advertisement. This was against 10 per cent being spent by other food companies.

He said that the equity holding pattern of BIL remained unchanged at 44 per cent by promoters, 20 per cent by FIs, 4.49 per cent by mutual funds, 6.8 per cent by FIIs two per cent by Indian companies and the balance by public.

Of the promoters holding Groupe Danone of France and the Wadia group account for 22 per cent each.

The company was trying hard to reduce the expenditure on power. It recently engaged Tata Energy Consultants to suggest ways for doing so.

The Business Line 12.08.2000



GOVT. CIRCULAR

PRESS INFORMATION BUREAU
GOVERNMENT OF INDIA

EXPORT OF AGRICULTURAL PRODUCTS MEASURES TO BOOST EXPORTS

New Delhi, ASADHA 7, 1922

June 28, 2000

The exports of agricultural products including tea, coffee, marine, castrol oil, and cotton from the country in the past five years have been as follows:

YEAR	EXPORTS (in Rs. Crore)
1994-95	13166.22
1995-96	20243.56
1996-97	22283.32
1997-98	24626.16
1998-99	25224.63

The major agro items exported from India are Rice-both Basmati and non-Basmati, Spices, cashew, Oil cakes/meals, and Tobacco. There is a growing business of export of fresh fruits and vegetables, flowers, processed foods and vegetables, meat and products, sugar, shellac, niger seed, guar gum and ground nut seed and other seeds.

Some of steps taken/proposed to be taken by the Government to boost export of agricultural products include.

- (i) Providing assistance for raising small and large nurseries for production of good quality planting material, up gradation of technical knowhow of farmer through demonstrations, training and publicity, rejuvenation of old orchards, area expansion, supply of mini kits for vegetable, improving productivity and training of farmers under the Centrally sponsorted Scheme on Integrated Development of Tropical, Temperate and Arid Zone fruits;
- (ii) Grant of financial assistance for improved packaging and strengthening of quality control including adoption of quality systems such as ISO 9000/HACCP at export units;

- (iii) Grant of air freight subsidy for export of selected fresh vegetables and fresh fruits;
- (iv) Establishment of vapor heat treatment facilities for improving the acceptability of the product especially mangoes in overseas markets. Research efforts are on for the use of modern technologies such as Controlled/Modified Atmosphere technologies in transportation for increasing the shelf life of perishable products such as mangoes and lychees;
- (v) Arranging promotional campaigns such as buyer-seller meets and participation in important international Fair and exhibitions,
- (vi) Setting up of integrated cargo handling and cold storage facilities at various International Airports for handling export of perishable items such as fresh fruits and vegetables;
- (vii) Providing technical advisory services and other support services to trade and industry including training of farmers for export production, quality control packaging transport etc.

Exports of agricultural products are, however, also dependent on a number of factors such as domestic production and consumption, exportable surpluses consumer preferences varieties traded quality, domestic and international prices, availability of infrastructure to store, process, transport and dispatch.



Directorate General of Shipping Ministry of Surface Transport Government of India, Walchand Hirachand Marg, Mumbai-400 001.

Dated : 27th March 2000

GUIDELINES FOR CHARTERING OF FOREIGN FLAG VESSELS

INTRODUCTORY

1.1 In part XIV - of the Merchant Shipping Act, 1958 - entitled 'Control of Indian Ships and Ships engaged in Coasting Trade', the provisions of Section 406 deal with Indian ships and chartered ships to be licensed and provisions of Section 407 deal with licensing of ships for coastal trade. As laid down in these sections, the license has to be granted by the Director General of Shipping (hereinafter DG) for chartering of Indian or other ship by a citizen of India or a company or a cooperative society under Section 406 and for ship other than Indian ship or a ship chartered by a citizen of India or a company or a cooperative society for engaging in the coasting trade of India under Section 407.

1.2 Sub-section (3) of 406 and sub-section (2) of Section 407 empower the DG Shipping to give the license subject to such conditions as may be specified by the DG shipping.

1.3 In the public interest and in order to ensure transparency and equitable consideration for Indian Shipowners, Shippers, project authorities, other public and private parties (citizens/companies/ societies and PSUs and joint Ventures), and above all the Indian consumers, the Director General of Shipping is hereby pleased to lay down the following guidelines, which amongst other things, shall govern the issue of license for chartering of Indian and Foreign Flag Vessels for export, import, coastal trade, project-based and / or offshore activities etc. in supersession of all guidelines issued by this Directorate previously including those vide letter No. SD-9/CHRT(82)/97 dated 9.8.99 enclosing the minutes of the meeting held on 22.7.99 and vide letter No. SD-9/CHRT(82)/97-II dated 15.12.99 enclosing the minutes of the meeting held on 25.10.99.

1.4 These guidelines are also applicable to dredgers, offshore supply vessels etc. and in short all sea-going vessels fitted with mechanical means of propulsion (except sailing vessels) to whom Part XIV of the M.S. Act 1958 is applicable.

1.5 The following guidelines shall come into operation with immediate effect.

Charter of foreign flag vessels for export

2.1 The applicant should submit their application in the prescribed format as at Annex A or B with necessary fees atleast three working days prior to commencement of the laycan except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container Vessels.

2.2 Prior to above, the applicant should submit their enquiry consisting of details regarding specification of the requirement of vessel, quantity of cargo, laycan, port of loading and discharge etc. to Indian National Shipowners' Association (hereinafter INSA) and DG Shipping atleast seven working days prior to laycan. However, in respect of requirement of following vessels the time shall be 2 days:

"Crude carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels"

2.3 On receipt of the enquiry from the applicant, INSA shall circulate the same to its concerned Member Shipping Companies who in response thereof shall forward to the Applicant the offers they wish to make giving details of suitable Indian flag vessel, Charter hire etc., endorsing copies of the offers made to INSA as well as to the Director General of Shipping. The offers should be made by the INSA Members within not more than 3 working days after receipt of the enquiry in respect of all vessels, except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels. In respect of these latter vessels, INSA Member Companies shall make their offers to the applicant within one working day after receipt of the enquiry. INSA shall in response to the enquiry of the applicant inform the DGS the offers made by its Member companies and endorse a copy of the same to the applicant company within atleast 3 days in respect of all vessels except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels.

Charter of foreign flag vessels for import

3.1 The applicant should submit their application in the prescribed format as at Annex-C or D with necessary fees atleast three working days prior to commencement of the laycan except in the case of Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels.

3.2 Prior to above, the applicant should submit their enquiry consisting of details regarding specification of the requirement of vessel, quantity of cargo, nature of cargo, laycan, port of loading and discharge etc. to INSA and DG shipping atleast seven working days prior to laycan. However, in respect of requirement of following vessels the time limit shall be 2 days:

"Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels".

3.3 On receipt of enquiry from the applicant, INSA shall circulate the same to its concerned member shipping companies who in response thereof shall forward to the Applicant the offers they wish to make giving details of a suitable Indian flag vessel, Charter hire etc. endorsing copies of the offers made to INSA as well as to the Director General of Shipping. The offers should be made by the INSA Members within not more than 3 working days after receipt of the enquiry in respect of all vessels except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels. In respect of these latter vessels, INSA member companies shall make their offers to the Applicant within one working day after receipt of the enquiry. INSA shall in response to the enquiry of the applicant inform DGS the Offers made by its Member Companies and endorse a copy of the same to the applicant company within atleast 3 days in respect of all vessels except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels.

Chartering permission for coastal trade/off-shore operations

4.1 These guidelines apply to all applications for charter permission for time or voyage charter of foreign flag vessels for offshore activities/movement of petroleum products/cement/bulk cargo/dredging/off-shore construction and repair/lighterage operation etc. from any port or place in India to any other port or place on the continent of India.

4.2 The applicant when it is a spot charter without any tender process having been followed, should submit their application in the prescribed format as at Annex C or D with necessary fees atleast three working days prior to the commencement of laycan except in the case of Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels the time limit shall be two days.

4.3 Prior to above, the applicant should submit enquiry consisting of details regarding specification of the requirement of vessel, quantity of cargo, nature of cargo, laycan, port of loading and discharge etc. to INSA, ICC and DG Shipping atleast seven working days prior to laycan. However, in respect of requirement of following vessels the time limit shall be 2 days:

"Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels"

4.4 On receipt of the enquiry from the applicant, INSA/ICC shall circulate the same to its concerned Member Shipping Companies who in response thereof shall forward to the Applicant the offers they wish to make giving details of a suitable Indian flag vessel, Charter hire etc. endorsing copies of the offers made to INSA/ICC as well as to the Director General of Shipping. The offers should be made by the INSA/ICC members within not more than 3 working days after receipt of the enquiry in respect of all vessels except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container vessels, In respect of these latter vessels, INSA/ICC Member Companies shall make their offers to the Applicant within one working day after receipt of the enquiry. INSA/ICC shall in response to the enquiry of the applicant inform the DGS the offers made by its member Companies and endorse a copy of the same to the applicant inform the DGS the offers made by its member Companies and endorse a copy of the same to the applicant company within atleast 3 days in respect of all vessels except Crude Carriers, Chemical Carriers, Gas Carriers, Product Tankers, Feeder and Container Vessels.

Liberalised Measures

5.1 Enquiry with, or No-Objection Certificate from INSA/Indian Coastal Conference (ICC) is not necessary wherever open or global tender, incorporating the provisions of these guidelines has been floated. That process would have provided scope for Indian citizens/companies/societies having Indian flag vessels to participate in the said tender. In the said tender process, the right of first refusal will remain with the Indian vessel owner on his showing readiness to take up the job at the lowest price indicated by the foreign flag vessel. Where the said Indian citizens/companies societies have failed either to participate or obtain the order, they cannot be allowed to obtain the same or part of the same work at any cost merely through the cabotage provisions found in section 407 read with Section 406, of The MS Act, 1958.

5.2 Unless the Indian Vessel becomes successful in the evaluation of the technical bid, it will not be eligible for any further consideration and support under the provisions of Section 407 of the MS Act, 1958.

5.3 The party, which offers the Indian Flag vessel, should meet the commercial requirement by matching the lowest bid and there shall be no price preference in favour of the Indian flag vessels. If any expenditure incurred by the Indian vessel-owner is being borne by the charterer for the foreign flag vessel, that shall be suitably added to the price while comparing the costs. On such calculation if the Indian vessel is offered at the same price as the foreign vessel, the license under Section 407 will NOT be granted for the foreign-flag vessel, and for this purpose a foreign vessel would include a vessel held on BBOD by Indian citizen/company/society. If, however, more than one Indian tenderer is involved, then the first offer will be made to the lowest among the Indian

tenderers, and on his failure to match the lowest foreign tender, the next higher Indian tenderer will be given the offer to match the lowest foreign tender and so on.

5.4 In respect of turn-key projects such as construction of or repairs to port, terminal, berth, jetty, offshore platform etc., including dredging operations, if the formal Agreement or Understanding lays down that the successful bidder should have his own group of vessels which are complimentary to each other for the performance of the contract, then the license under Section 407 will be given for the foreign flag vessel in accordance with the said contract.

5.5 If there is dispute relating to technical specifications of the vessel given in the tender advertisement, the matter may be referred to the Directorate-General for decision as to whether the Indian vessel with a difference in specifications should be chartered and not the foreign flag vessel. As far as practicable, this decision will be taken after discussion with the concerned parties.

Non INSA members

6.1 For non-INSA members, a copy of the enquiry shall, as has been the prevailing practice, be displayed on the notice board of the office of the Director-General Shipping within the time stipulated above.

Crisis or emergency

7.1 In the event of an emergency or crisis, however, the Director-General of Shipping retains the right to take action as deemed fit, overriding any of the guidelines laid down hereinabove.

Mumbai
27th March 2000

Sd/-
D.T. Joseph
Director-General of Shipping
Government of India



PRESS INFORMATION BUREAU GOVERNMENT OF INDIA

PLANNING COMMISSION CONSTITUTES ADVISORY GROUP ON TAX POLICY AND TAX ADMINISTRATION

New Delhi, July 14, 2000
Asadha 23, 1922

Planning Commission has constituted an Advisory Group on 'Tax Policy & Tax Administration' under the Chairmanship of Dr. Parthasarathi Shome, RBI, Professor, ICRIER. The Advisory Group will examine and recommend practical policy initiatives aimed at improving resource mobilization for the Tenth Five Year Plan consistent with achieving 7.5 to 8 per cent growth.

The other members of the group are Dr. D.K.Srivastave (Senior Fellow, NIPEP), Shri DB Lal (Ex-Member, CDBT), Shri Sukumar Mukhopadhyaya (Ex-Member, CBEC), Dr. N.J. Kurian (Adviser (FR), Planning Commission) and Dr. Pawari Agarwal (Senior Fellow, NIPEP).

The Terms of Reference of the Group will be as follows:

1. To analyze the performance of tax revenue and its major components in relation to GDP over the 1990s in the Centre and the States.
2. To examine the structure of personal income tax and recommend means of expanding its base, in particular, by streamlining tax incentives.
3. To examine the structure of corporation tax and recommend; (i) means of expanding its base and (ii) simplification of the overall structure as specified in the current year
4. To examine the present status of the Central Value added tax (CENTVAT) and make appropriate recommendations for its improvement in both structure and revenue generating capacity;
5. To study the implications for resource mobilization of the declared objective of reducing tariffs to East Asian levels in a phased manner.
6. To study the scope for expanding the base on taxes on services keeping in mind experience in other countries;
7. To study the feasibility of a Value Added Tax (VAT) at the levels of States and the necessary components and steps needed to make it feasible;
8. To make other specific proposals for improving sales tax collection in the States pending the shift to a full State level VAT.
9. To study the scope for mobilizing resources through other tax revenues at the State level;
10. To study the possibility of achieving the objective of a national VAT in which the CENVAT and State taxes or State VAT can be integrated and also the scope for integration of service taxation within such a national VAT
11. To suggest constructive tax administration measures for the effective implementation of the recommended tax policy reform at both the Central and State levels.

The Group is expected to submit its report by end November, 2000.



FAIRS & SEMINARS

Andhra Pradesh Industrial & Technical Consultancy Organisation Ltd. (APITCO), a premier Indian Technical Consultancy Organisation and Public Sector Undertaking established more than 24 years ago in Hyderabad is conducting a two day International Seminar cum Exhibition on "Your opportunities and challenges in the Dairy Industry in the 21st Century" on 15th and 16th September, 2000 in Hotel Taj Krishna at Hyderabad.

Interested persons/parties/Cos may contact Shri S. Srinivas Rao, Managing Director, APITCO, 8th Floor, Parishram Bhavan, Basheerbagh, Hyderabad - 500 029 Tel =91-40-3233625, 3237333, 3237981, fax =91-40-3298945. e-mail : apitco@hdlvsn.net. Website : www.apitco.org.



Technology Summit and Technology Platform 14-15, November-2000 at Hotel Taj

Residency, Hyderabad.

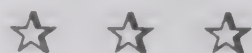
The Technology Summit and Technology Platform 2000- the annual flagship even of CII in the area of Technology will be organised on 14-15 November 2000 in Hyderabad.

The Summit will focus on :

Technology Upgradation and Modernisation in Industry. Energy efficient transmission/distribution/ electrical products. Urban and Industrial waste management & Space based tele-activities.

Interested persons/parties/Cos may contact:

Shri S.Srinivasan, CII,
Gate No. 31, North Block,
Jawaharlal Nehru Stadium, New
Delhi-110003. Tel: 4366276,
436225, 4366281-2 Fax 4366271/
4367844. Internet :
www.ciionline.org. E-mail:
cii@sai.cii.ernet.in.



Hogatec - International Fair
Hotels, Gastronomy, Catering,
5 to 9 November 2000,
Dusseldorf.

The above International Fair Hotel is being organised by Messe Dusseldorf GmbH, Postfach 10 10 06 40001 Dusseldorf, Germany

Following will be exhibited in this fair:

Catering Technology, Catering Systems, Fast - Food Engineering, Technical Equipment, Appliances and Installations, Data, Communications and Information Systems, Interior Furnishing Equipment, Design, Guest and Consumer Goods etc.

Interested person/parties/Cos may contact Mr. K.C. Damodaran, Director, Indo-German Chamber of Commerce, Maker Tower E, 1st Floor, Cuffe Parade, Mumbai - 400 005. Tel - 022-218 6131/218 61 18 Fax 022 - 218 05 23 E-mail : ruby@indo-german.com.



FREE OPPORTUNITY TO DEVELOP YOUR TRADE

IDFT Expo 2000 is taking place from October 3rd to 6th, 2000 at Pragati Maidan, New Delhi. This is an International Exhibition and Foreign Companies are participating from abroad. There is a seminar on the theme " Recent Development in Food Processing & Packaging". You are invited to attend the seminar & the fair.

APEDA NEWS

Agricultural and processed food products Export Development Authority (APEDA)

**Subject : Cancellation of APEDA Registration Certificate for 'Nil'
export during the last 12 months.**

Attention of registered members of APEDA is drawn to the provisions of APEDA Act, 1986 Section 14 (1) and APEDA Rules 1986 Chapter 5 Clause 11 and 13 and APEDA Rules. 1998 Clause 11. As per these provisions, it is mandatory for the exporters to submit export returns on regular basis. Further, failing to export any of the scheduled products during a period of 12 consecutive months, may result in the cancellation of the registration issued by APEDA. In the past it is noticed that a large number of exporters have not been submitting the export returns to APEDA. The intention of calling for export returns is to create database of export performance of various scheduled products and to generate the list of active exporters who could be extended the services like sending the trade enquiries and newsletters and also extending invitation for meeting foreign delegations, nomination for APEDA Award etc. APEDA plans to host in its web-site the profile of active exporters, who export APEDA scheduled products regularly and submit their returns. In spite of the fact that over 16000 members are registered with APEDA, the number of active exporters is limited. In order to serve the exporters better it is decided that registered exporters will henceforth submit half - yearly returns for the period April- September and October - March in the following format so as to reach APEDA by 15th October and 15th April each year. The consolidated export performance for the year 1999-2000 be sent by 31st July, 2000 in the following format:

PROFORMA FOR ANNUAL / MONTHLY EXPORT RETURN

Name of Exporter	:				
Registration No.	:				
For the Period	:				
Product(s)	Product code	Country	Quantity:	Value (FOB)	Port of
Description	ITC (HS)	(Destination)	KG/Tonnes/Ltrs.	Rs. Lakhs	Shipment in
			Hanks/Nos.		India

TOTAL

Latest address of communication including email address may be mentioned to enable us to update our database and to serve you better.

In case of none receipt of export returns on the above format it will be presumed that registered members have not exported any of the scheduled products during the last consecutive period of 12 months and action will be taken for cancellation of their registration as per the provisions of the Act. The export returns till June, 2000 are required to be sent on the following address : SECRETARY, APEDA, 3rd Floor, NCUI Buidlig, 3, Siri Institutional Area, August Kranti Marg, Opp. Asiad Village, New Delhi - 110 016.

JOINT VENTURE

INDIAN FOOD DELEGATION TO VISIT CANADA

A ten-member Indian delegation of leading processed food products importers and consolidators is visiting Canada at the invitation of the Government of Canada, to attend the Access Asia 2000 series of food shows in Montreal, Toronto, Calgary and Vancouver, 24-30 September, 2000. These shows are organized by the Department of Agriculture and Agri-Food, Government of Canada. The Indian buyers will get an opportunity to see and taste the Canadian value-added foods, and to have face-to-face³ interaction with Canadian manufacturers to discuss business deals. Mr Ram Gupta, Senior Trade Advisor, Canadian High Commission will accompany the Mission which includes CEOs of Euro Fruits Pvt. Ltd, Gits Foods, and Modern Cream Dairy from Mumbai; GD Overseas, Soft Sensations and Geekay Sales Corporation from New Delhi; and S.P. Exim Pvt. Ltd. from Punjab.

Canada's exports of agri-food to India in 1999 were Cdn. \$51 million accounting for about 13 per cent of Canada's total exports of Cdn. \$396 million. In the same year Canada's imports of agri-food from India were Cdn. \$92 million, which were about 9 per cent of Canada's total imports of Cdn. \$1005 million. It is hoped that this visit will help to increase the agri-food trade between the two countries considerably.



RESEARCH ARTICLES

DEVELOPMENT OF ALTERNATIVE PRESERVATIVE

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ABSTRACT

A preservative formulation (coded as SK1) including sodium hexametaphosphate, O-phosphoric acid and propionic acid was found effective against yeast, mould and bacteria at 2% concentration. This formulation was found comparable to KMS in its antimicrobial efficacy. In vitro studies indicated that SK1 had synergistic effect with KMS, potassium sorbate and sodium benzoate.

INTRODUCTION

In developing countries like India, where refrigerated storage or transportation is not always economically feasible, the processing industry depends largely on chemical preservative (Arya, 1996). Though, a number of permitted class II preservatives are being used but they all have one or the other limitation. For example, sulfur dioxide (SO₂), one of the most commonly used preservatives, binds with vitamin B₁, thus making it unavailable (Desrosier, 1970). It, also, decolourises foods containing anthocyanin pigment. Recently, sulfur dioxide, sulphites and metabisulphites have been found to precipitate allergic reaction in about 10% of asthmatic patients. The symptoms of adverse effects of SO₂ may manifest into dizziness,

chest pain, eye irritation and difficulty in breathing (Aruna et al, 1997). Benzoic acid is mainly active below pH 4.5 and acts mostly against yeast and mould and is less effective against bacteria. Benzoate in foods at concentration of 0.1% can impart disagreeable peppery flavour or burning taste to the food (Desrosier, 1970). Though, sorbate is far superior to benzoic acid in antimicrobial action and for maintaining sensory food quality, yet its use is not very common because of higher cost (Arya, 1996). Moreover, preservative action of sorbic acid is mainly directed against yeasts and moulds (mostly aflatoxin producing fungi) and partially against bacteria. Therefore, there is a need to develop preservative with enhanced microcidal activity and better health and environmental acceptability. With this objective, we have

developed a preservative formulation having polyphosphate, o-phosphoric acid and propionic acid as the ingredients. Its minimum inhibitory concentration (MIC), optimum pH, added influence of heating on its microcidal effectiveness and synergism with conventional preservatives were studied. Its microcidal effectiveness was tested under in vivo conditions (mango pulp) and compared with that of potassium metabisulphite.

MATERIALS AND METHODS

Determination of Minimum Inhibitory Concentration (MIC) of different combinations: Sodium hexametaphosphate, O-phosphoric acid and propionic acids were mixed in different proportions and diluted with distilled water in the ratio of 1: 4. Five combinations viz. T₁, T₂, T₃, T₄ and T₅ were formulated. For each formulation, five

concentrations viz. 1, 2, 3, 4 and 5% were tested. Antimicrobial activity was tested against yeast (*Saccharomyces cerevisiae*), mould (*Aspergillus niger*) and bacterium (*Pseudomonas* sp.) by poison plate technique (Collins and Lyne, 1985). The above mentioned organisms were maintained on Yeast extract Potato Dextrose Agar (YEPD), Potato Dextrose Agar (PDA) and Nutrient Agar (NA), respectively (Collins and Lyne, 1985). Preservative formulations T₁ to T₅ at 1 to 5% concentration were added to YEPD, NA and PDA media just before inoculation. For yeast or bacterium, one ml of cell suspension containing approximately 10⁵ cells (actively growing) was added to the medium, whereas, for fungus single point inoculation technique was followed. After 48 hr. of incubation at 30±2°C, the number of yeast and bacterial colonies were counted, while in case of fungus, colony diameter was measured. Lowest concentration of each formulation at which complete microcidal activity was observed, was termed as MIC. The formulation showing least MIC was coded as SK1.

Determination of optimum pH for maximum effectiveness of SK1:

100 ml of sterilized YEPD broth of different pH viz. 3.0, 4.5, 5.5 and 6.5 having SK1 @ 2% was inoculated with properly diluted *Saccharomyces cerevisiae* to get an initial optical density of 0.080 at 540 nm. The inoculated flasks were incubated at 37°C. The change in O.D. was noted after 24 hr.

Comparison of microcidal effect of SK1 with KMS:

Mango pulp was preserved with SK1 at 2% concentration or KMS (1000 ppm). The pulp was stored in 750 ml capacity crown corked glass bottles. Microbial counts were measured at zero time and after two and four months of storage.

Influence of heating on microcidal property of SK1:

Mango pulp var. *Dashehari* was given the following treatments:

- a- Unheated without preservative
- b- Unheated with preservative (SK1 at 2% conc.)
- c- Heated without preservative
- d- Heated with preservative (SK1 at 2% conc.)

The pulp was filled into glass bottles (750 ml cap. crown corked) and then stored at ambient temperature (35±5°C) for further observations.

Testing synergism of SK1 with conventional preservatives :

SK1 was added to PDA medium @ 0.5 to 2.0% alone or in combination with Potassium metabisulphite, Sodium benzoate or Potassium sorbate (100 ppm). Control plates without preservative were also prepared. The medium plates were inoculated with *A.niger* by single point inoculation. The plates were incubated for 3 days at 30±2°C. Diameter of fungal colony was measured.

RESULTS AND DISCUSSION

Phosphates and polyphosphates

are multi functional ingredients used extensively in food processing. The wide acceptance of these preservatives is due to the fact that these substances occur naturally in food stuff consumed by man. In addition to their moisture binding properties, polyphosphates have been reported to inhibit various bacteria including *Pseudomona* (Palumbo et al., 1995). Phosphoric acid has been recommended by FPO as additive in sweetened aerated water containing fruit pulp. Their antibacterial activity is due to chelation of metal ions needed for bacterial growth (Prasad and Kate, 1997; Zessin and Shelf, 1988). Similarly, several organic acids including propionic acid are known to inhibit the activity of various food borne pathogens (Golden et al. 1995). O-Phosphoric acid is an excellent low cost acidulant and can replace organic acids such as citric, malic, tartaric acid etc. It is used in the preservation of low pH sauces, mayonnaise, dressings, salads, drinks, fruit juices and concentrates. It acts mainly by lowering the pH and thus preventing the growth of microorganisms (Prasad and Katre, 1997). Bloomfield and Arthur (1994) opined the accessibility of target to biocide may be improved by coincident use of cell permeabilizing agents. Moreover, judicious combination of biocides having biochemically or physiochemically complementary mechanism of action may lead to synergy (Denyer 1995). We formulated our preservative on this principle. The results of minimum inhibitory concentration study are

expressed in Table 1. The data suggested that formulation T5 was most effective against yeasts, moulds and bacteria with a minimum inhibitory concentration of 2%. Hence, this concentration was selected for further study and was coded as SK1.

The next step was to standardise the optimum pH for antimicrobial activity of SK1. pH 5.5 was found optimum for maximum effectiveness of SK1 as maximum growth restriction (compared to control) was observed at this pH (Fig 1). At pH 3.0, no growth was observed even in the control samples. This might be due to the failure of yeast to grow at such low pH.

The above studies were conducted under *in vitro* conditions. It is necessary to test the preservative under *in vivo* conditions because the suitability of antimicrobial additives in food products is determined by the nature of food product, its pH composition, type and level of microbial contamination in the product. Sometimes loss of antimicrobial activity occurs if the preservative reacts with food constituent resulting in binding of chemical structure of preservative. Mango pulp is a high sugar medium having high TSS value (16-20). With this view antimicrobial activity of SK1 was tested under *in vivo* conditions and compared with that of KMS, the most frequently used preservative. Comparison of microcidal effect of SK1 with KMS (1000 ppm) showed that the former was equally effective against yeast, moulds and bacteria (Table 2).

Antimicrobial preservatives are rarely used alone. They are used in combination with other processing treatments like pasteurization, refrigeration, partial dehydration, packaging etc. (Arya, 1996). We studied the influence of heating on hastening SK1's microcidal effect. It was observed that heating combined with SK1(d) increased the shelf life of mango pulp to more than 6 months (Fig 2). However, T₅ alone in unheated pulp (b) could preserve the mango pulp for more than two weeks compared to heated pulp without preservative (c) exhibiting shelf life of only 72 hr. the product. Unheated pulp without preservative (a) was spoiled within 24 hr. Not much difference in bacterial counts were observed in b, c and d treatments (Fig 2). This might be due to the fact that most bacterial isolates belonging to the *Bacillus* group are less affected by heat or preservative treatments (Frazier, 1987). Yeast and moulds were more affected by heating alone than SK1 treatment. However, combination of heat and preservative led to maximum killing of yeasts and moulds (Fig 2).

The mango pulp storage studies using 2% SK1 indicated that it could work as potential food preservative. However, a little browning of the pulp was observed, while SO₂ treated pulp showed no browning. Since SO₂ is considered an objectionable class II preservative, our purpose was to discourage use of higher concentration of KMS (1000 ppm). However, a little problem of browning was observed in SK1 preservative which could be overcome by combining SK1 with

minimum amount of SO₂. Combined preservative effect with SO or potassium sorbate or sodium benzoate was tested under *in vitro* conditions. It was observed that the plates having KMS or sorbate or benzoate alone at 100 ppm level showed significant fungal growth. In plates having SK1 at 1 or 2% concentration, there was no fungal growth. While at 0.5% level, reduced fungal growth was observed (Table 3). Combination of 0.5% SK1 with 100 ppm KMS or sorbate or benzoate reduced the fungal growth significantly. Hence it was concluded that combination of SK1 with other preservatives has synergistic activity.

Our results have indicated that SK1 may act as a potential preservative against yeasts, moulds and bacteria. However, *in vivo* testing on more fruit products is needed before the final recommendations can be made.

ACKNOWLEDGMENT

Authors are thankful to Director, CISH for providing necessary facilities for conducting this research.

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Table 1 : Screening and minimum inhibitory concentration determination of various preservative formulations under in vitro conditions.

Preservative formulation	Concentration (%)	S.Cerevisiae (Cells/ml)	Pseudomonas sp. (Cells/ml)	A.niger colony diameter (cm)
T1	1	4.2×10^5	7.2×10^5	1.4
	2	4.5×10^3	3.4×10^4	0.5
	3	nil	2.7×10^3	nil
	4	nil	1.9×10^2	nil
	5	nil	nil	nil
T2	1	2.9×10^5	6.4×10^5	1.0
	2	1.6×10^6	4.3×10^4	0.4
	3	nil	1.6×10^3	nil
	4	nil	nil	nil
	5	nil	nil	nil
T3	1	9.5×10^3	1.9×10^5	0.4
	2	nil	3.1×10^4	nil
	3	nil	0.6×10^3	nil
	4	nil	nil	nil
	5	nil	nil	nil
T4	1	6.4×10^3	4.2×10^4	0.2
	2	nil	2.0×10^3	nil
	3	nil	nil	nil
	4	nil	nil	nil
	5	nil	nil	nil
T5	1	1.7×10^3	1.0×10^3	0.1
	2	nil	nil	nil
	3	nil	nil	nil
	4	nil	nil	nil
	5	nil	nil	nil
Control (no preservative)		2.5×10^6	7.0×10^6	2.0

* After 48 hr of incubation at $30 \pm 2^\circ\text{C}$

**Table 2 : Storage studies of mango pulp :
Comparison of microbial effect of SK1 with KMS.**

Storage time (months)	SK1 at 2% concentration		KMS (1000 ppm)	
	Yeasts and moulds (CFU/g)	Bacteria (CFU/g)	Yeasts and moulds (CFU/g)	Bacteria (CFU/g)
0	nil	1.0×10^1	nil	1.1×10^1
2	nil	0.1×10^1	nil	0.1×10^1
4	nil	0.1×10^1	nil	0.1×10^1

Table 3 : Synergistic activity of new preservative SK1 with conventional preservatives under *in vitro* conditions.

S. No.	Treatment	Fungal colony diameter* (cm)
1	Control (No preservative)	2.8
2	Pot. metabisulphite (100 ppm)	2.6
3	Pot. sorbate (100 ppm)	2.6
4	Sod. benzoate (100 ppm)	2.7
5	SK1 (2%)	No growth
6	SK1 (1%)	No growth
7	SK1 (0.5%)	1.7
8	SK1 (2%) Pot. metabisulphite (100 ppm)	No growth
9	SK1 (1%) Pot. metabisulphite (100 ppm)	No growth
10	SK1 (0.5%) Pot. metabisulphite (100 ppm)	0.9
11	SK1 (2%) Pot. sorbate (100 ppm)	No growth
12	SK1(1%) Pot. sorbate (100 ppm)	No growth
13	SK1 (0.5%) Pot. sorbate (100 ppm)	1.0
14	SK1 (2%) Sod. benzoate (100ppm)	No growth
15	SK1 (1% Sod. benzoate (100ppm)	No growth
16	SK1 (0.5%) Sod. benzoate (100ppm)	0.5

*after 3 days of incubation at $30 \pm 2^\circ\text{C}$

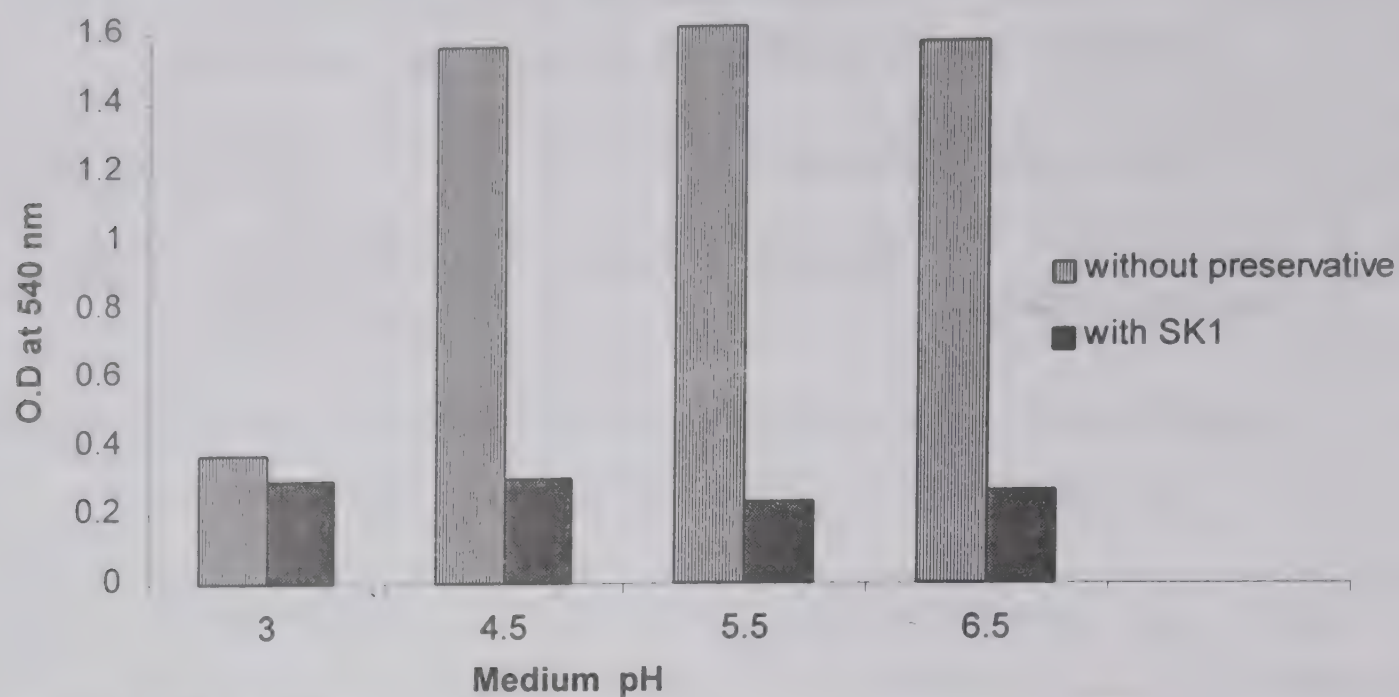


Fig. 1: Effect of medium pH on antimicrobial activity of SK1 after 24 hr of incubation under *in vitro* conditions.

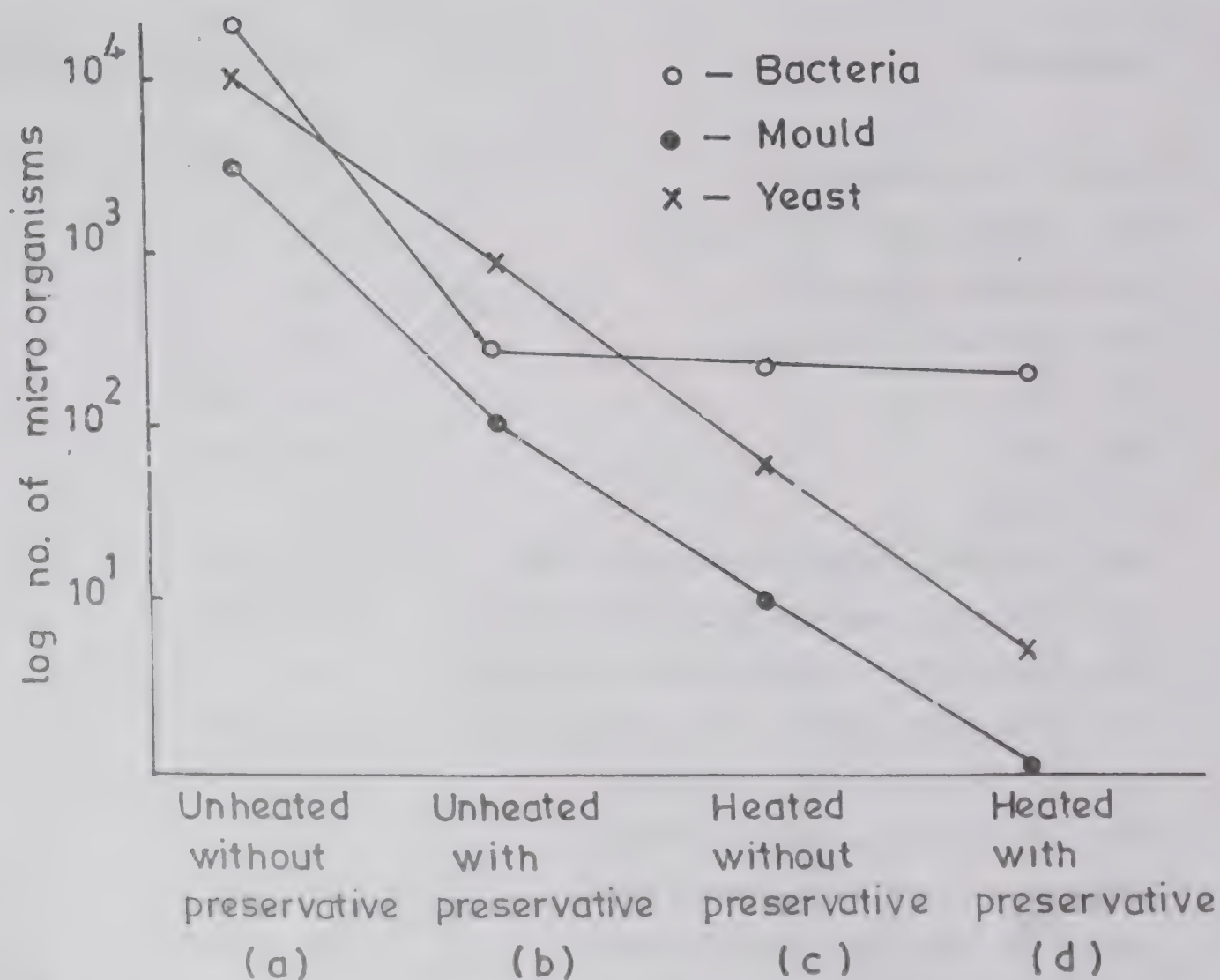


Fig. 2: Influence of heating on microcidal property of SK1 at zero time

STUDIES ON BLENDING OF GUAVA PULP WITH MANGO PULP FOR DEHYDRATION (MANGO-GUAVA SHEET)*

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18-B, Ashok Marg, Lucknow, U.P.

ABSTRACT

Dried mango pulp or mango sheet popularly called "*Ampapar*" is an important product of commerce in certain mango growing areas of India. However the product prepared by traditional method is *far from satisfactory*. The methods employed by various workers to improve the quality of mango sheet, include addition of sugar, citric acid, potassium metabisulphite and pectin etc. Use of pectin in this preparation is, however, a costly proposition. Attempts were made in this study to replace the use of pectin by addition of guava pulp, which is not only a good source of natural pectin but of vitamin 'C'. Mango pulp blended with 5, 10, 15 and 20% guava pulp and maintaining the T.S.S. at 25°Brix, acidity 0.5% and sulphurdioxide 1000 ppm was dehydrated. Evaluation showed that mango pulp with 20% guava pulp gave a better sheet on drying followed by the one with 15% guava pulp. The ideal moisture to have storage stability was found to be in between 10 to 15% with relative humidity in between 65 to 75 percent.

INTRODUCTION

Mango is said to be the king of tropical fruits because of its high palatability, excellent taste and high nutritive value. Mango is utilized in the production of a wide range of preserved products. Dried mango pulp or mango sheet/leather, popularly called "*Ampapar*" is an important article of commerce in certain mango growing areas of India. The product prepared by traditional methods is far from satisfactory. According to Rao and Roy (1980), it often has a dark or deep brown colour and carries a lot of dust, insect eggs and is very sticky.

An improved process for the preparation of *Ampapar* has been

patented by Siddappa et al (1953), in which the edible portion of the fruit was steeped in acidified sugar solution overnight before pulping and drying on the following day. Das et al (1955), studied the losses of ascorbic acid and carotene during preparation and storage of dried mango pulp. Heikal et al. (1972) improved the flavour and texture of finished product (mango sheet) by the addition of citric acid and pectin. According to Rao and Roy (1980), the ideal sugar/acid composition for the preparation of mango sheet/leather of *Baneshan*, *Bombay Green* and *Dashehari* cultivars were found to be 25°B and 0.5 percent acidity. Use of pectin in the preparation of *Ampapar*, however, is a costly

proposition. Attempts were made in this study to replace the use of pectin by adding guava pulp, which is not only a rich source of natural pectin (1.0%) but of Vitamin 'C' (210 mg/100 g) also. The product obtained could be a good source of natural carotenoids from mango and of vitamin 'C' from guava.

MATERIALS AND METHODS

Ripe mangoes of *Dashehari* cultivar and guavas of local variety were purchased from the market and were studied for their physical and chemical characters.

Extraction of Mango pulp : Ripe mangoes were thoroughly washed, peeled, sliced and homogenised in electric mixer. Recovery percentage was noted.

* The product can be nick named as "Man-gua" sheet.

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Extraction of Guaya pulp: Fully ripe but firm guavas (winter season) were washed properly and cut into rings. The rings were put in prestige pressure cooker and cooked for one whistle using 10 percent water. The pulp was strained through fine sieve to separate the seeds. The pulp was sulphited with 0.2 percent potassium metabisulphite (K.M.S.) and stored in 1 gallon glass jars for use in mango season for blending.

Acidity and total soluble solids (T.S.S) of mango pulp (except for the control treatment) was maintained at 0.5 percent and 25°B respectively by adding and citric acid and sugar from outside. The mango pulp was also added with 0.2 percent K.M.S. The mango pulp was then dried with the following treatments:-

1. Control
2. Mango Pulp (having 25°B, 0.5% acidity and 0.27. K.M.S.)
3. Mango Pulp + 0.5% pectin
4. Mango Pulp + 5% guava pulp
5. Mango Pulp + 10% guava pulp
6. Mango Pulp + 15% guava pulp
7. Mango Pulp + 20% guava pulp

The pulp was spread in the form of thin layer on aluminium trays having polyethylene sheet and dried in a cross flow cabinet drier at 60°C. The pulp was dried in single layer with 1 kg. pulp in each tray. Periodic reduction in weight of the pulp was recorded. The pulp was dried approximately to a moisture level of 15.0 percent. The dehydrated sheet was folded and packed in 300 gauge polyethylene

bags, heat sealed and placed inside friction top tin containers at room temperature.

Cut out examination of the sample was done immediately after dehydration and again after 6 months of storage. Peel, pulp and stone percentage was calculated. Total soluble solids were determined by hand refractometer after pulping the fruit and squeezing out the juice through muslin cloth. Moisture percentage was determined by drying the pulp to a constant weight in an electric oven at 65°C. Titratable acidity, sugars, carotenoids and free sulphur dioxide were estimated by A.O.A.C (1960) methods. Ascorbic acid was estimated by titrating against 2, 6 dichlorophenol - indophenol dye. Equilibrium Relative Humidity (E.R.H.) of blended mango sheet was calculated by Wink's (1946) Weight Equilibrium Method.

RESULTS AND DISCUSSION

Recovery percentage of peel, slice and stone of mango cultivar *Dashehari* is given in Table - I while the various constituents of fresh mango pulp and stored guava pulp used for blending are given in Table - II.

Periodic loss of moisture content on drying of pulps showed that the control treatment and the treatment with 0.5 percent pectin took less time to reach the desired moisture level in comparison to guava fortified samples (Table - III). Moisture was 11.0 to 11.30% in different treatments just after dehydration. Slight increase in moisture was noticed during the

storage period. As the pulp was concentrated due to removal of moisture during drying, the other constituents were found enhanced (Dry Weight Basis) in comparison to fresh pulp (Table - IV). The control sample which was not added with citric acid showed lower range of acidity in comparison to other samples with added citric acid or guava pulp which contained 1.0% acidity. Periodic increase in acidity was observed with the percentage increase of guava pulp blended in various treatments; however, slight decrease in acidity was observed during the storage period. This observation was in conformity with Mir and Nath (1993) but contrary to Rao and Roy (1980) who showed increase in acidity during storage with increase in storage temperature. Increase in acidity of certain fruit products had been attributed to the formation sulphurous acid from sulphur dioxide, ascorbic acid degradation or hydrolysis of pectin (Cruess, 1958).

Reducing sugars in different treatments were found to follow the acidity pattern just after dehydration; however, nominal increase was observed during storage, which might be due to acid hydrolysis of sucrose. Ammu et al (1977) also reported an increase in reducing sugars during storage of freeze dried mango powder. No significant changes were observed in total sugars on storage.

The retention of free sulphur dioxide after dehydration was found to be approximately half of the added sulphur dioxide to the

mango pulp. Minor losses were recorded during storage. Losses could be due to reaction of sulphur-di-oxide with food constituents (sugars, pectins, proteins, lipids), oxidation or volatilisation.

Retention of ascorbic acid was found higher in guava blended samples after dehydration and approximately 50 percent reduction was observed in all samples after six months of storage.

Organoleptic evaluation :

Organoleptic evaluation showed that mango pulp mixed with 20 percent guava pulp gave the best sheet on drying, obtaining 81.88% marks. This sheet was found to be significantly superior in colour, flavour and texture not only to acid-sugar and pectin added sheet (T.No. 2 and 3) but also to 5 and 10% guava pulp blended sheet (T.No. 4 and 5). However, no significant differences existed between 15 and 20% guava blended sheet in all the four characters. Mango sheet blended with 15 percent guava pulp was rated IInd obtaining 80.74% marks. Even 5 and 10% guava

pulp blended mango sheet were found better over other treatments without guava pulp. Pectin added sample was found organoleptically better only over control and acid-sugar adjusted sample (T.No.2). Control sample obtained lowest grading in this study (Table-iv).

Packaging and Storage Studies:

The study of equilibrium related humidity was conducted only on the mango sheet with 20 percent guava pulp. The initial moisture content of this sheet was 12%. The relationship between equilibrium moisture content, number of days the product took to reach equilibrium at a particular relative humidity and the general condition of the product at different relative humidities are shown in Table-VI. Humidity moisture equilibrium curve for this product is given in Fig. 1. It was noted that mould growth took place at 15.90% equilibrium moisture content of the blended sheet after 27 days. At higher R.H., the product had a tendency to gain moisture and became mouldy while at lower R.H. the moisture loss was greater and the mango sheet became gradually hard.

It is evident that ideal moisture to have storage stability would be in between 10-15% with R.H. between 65-75% though it was reported between 63.3-70% by Rao and Roy (1980) in the mango sheet of *Baneshan* cultivar.

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Table 1. Recovery of Peel, Slices and Stone of *Dashehari* Cultivar.

Name of Content	Weight in Kg.	Recovery (%)
Mango fruit	12.00	--
Peel	2.62	21.81
Seed	1.38	11.51
Pulp	8.00	66.66

Table II Constituents of Fresh Mango Pulp and Stored Guava Pulp used in blending.

Name of Pulp	T.S.S. (°B)	Moisture (%)	Acidity (%)	Red. Sugars (%)	Total Sugars (%)	VitC	50 ₂ (ppm) (mg/lvg)	Pectin (%)	Carotinois I
Mango	22	76.80	0.16	3.12	19.85	-	-	-	8.0
Guava	14	78.80	1.00	3.85	10.20	210	500	1.00	-

Table - III Periodic Weight loss in different Treatments of Ampapar during Drying.

Time (in Hour)	Treatment No.						
	1	2	3	4	5	6	7
Initial Weight of Sample (Kg.)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Weight After 1 hour (g)	565	515	580	715	735	777	660
Weight After 2 hours (g)	530	500	325	515	503	555	410
Weight After 3 hours (g)	295	370	300	365	340	355	350
Weight After 4 hours (g)	253	300	278	300	280	330	305
Weight After 5 hours (g)	-	280	-	270	260	260	283
Weight Retention after Drying(%)	25.30	28.00	27.80	27.00	26.00	26.00	28.50
Weight Reduction in Drying(%)	74.70	72.00	72.20	73.00	74.00	74.00	71.50

Table-IV. Chemical Constituents (Dry Weight Basis) of Ampapar just after Dehydration and after Six Months of storage.

Treatment No.	Moisture (%)		Acidity (%)		Red.Sugars (%)		Total Sugars (%)		SO (ppm)		Vit 'C' (mg/100g)	
	A	B	A	B	A	B	A	B	A	B	A	B
1.	11.00	11.50	0.58	0.52	10.51	12.55	60.00	60.55	-	-	25.0	15.0
2.	11.20	11.60	1.42	1.38	10.24	14.12	60.02	60.93	566	340	30.0	20.0
3.	11.40	12.85	1.40	1.25	12.71	14.55	60.20	61.20	566	342	35.0	20.0
4.	11.50	11.75	1.50	1.29	13.75	14.95	60.85	62.50	550	343	58.0	35.0
5.	11.40	11.90	1.52	1.35	13.81	16.00	61.00	61.47	540	345	60.0	35.0
6.	11.30	11.80	1.61	1.37	13.84	16.40	61.95	62.58	532	345	55.0	35.0
7.	11.50	11.95	1.63	1.39	13.94	-	62.00	62.56	530	346	55.0	35.0

A- Just after dehydration, B-After Six months of storage.

Table-V. Mean Score of Ampapar.

Treatment No.	1	2	3	4	5	6	7	S.E.	C.D. at 5%
Characters									
Colour	15.00	16.00	16.50	17.00	18.00	19.00	19.50	+0.624	1.48
Flavour	14.24	17.12	17.51	17.21	18.12	20.24	20.56	+0.650	1.30
Texture	15.50	18.41	18.67	19.51	19.00	20.50	20.70	+0.506	1.02
Taste	10.12	18.00	19.50	20.00	19.12	21.00	21.12	+1.180	2.36
Total	54.86	69.53	72.18	73.72	74.24	80.74	81.88		

S.E. - Standard Error

C.D. - Critical Difference

Table - VI. Equilibrium Relative Humidity for Dehydrated 20% Guava Pulp blended Ampapar at R. T. (30-32°C)

Equilibrium Moisture Content (%)	Equilibrium Relative Humidity (%)	Number of Days Required to reach Equilibrium	Remarks
0.42	2.00	60	Product very hard Brittle, Colour, Whitish
0.44	11.10	58	-do-
2.01	22.50	50	-do-
2.61	32.90	45	-do-
5.44	43.90	38	-do-
7.34	53.50	29	Product, Colour natural
10.59	64.80	25	Texture good, colour natural
15.90	75.50	-	Mould growth after 27th days
26.75	86.50	-	Mould growth after 12th days
35.64	100.00	-	Mould growth after 4th days

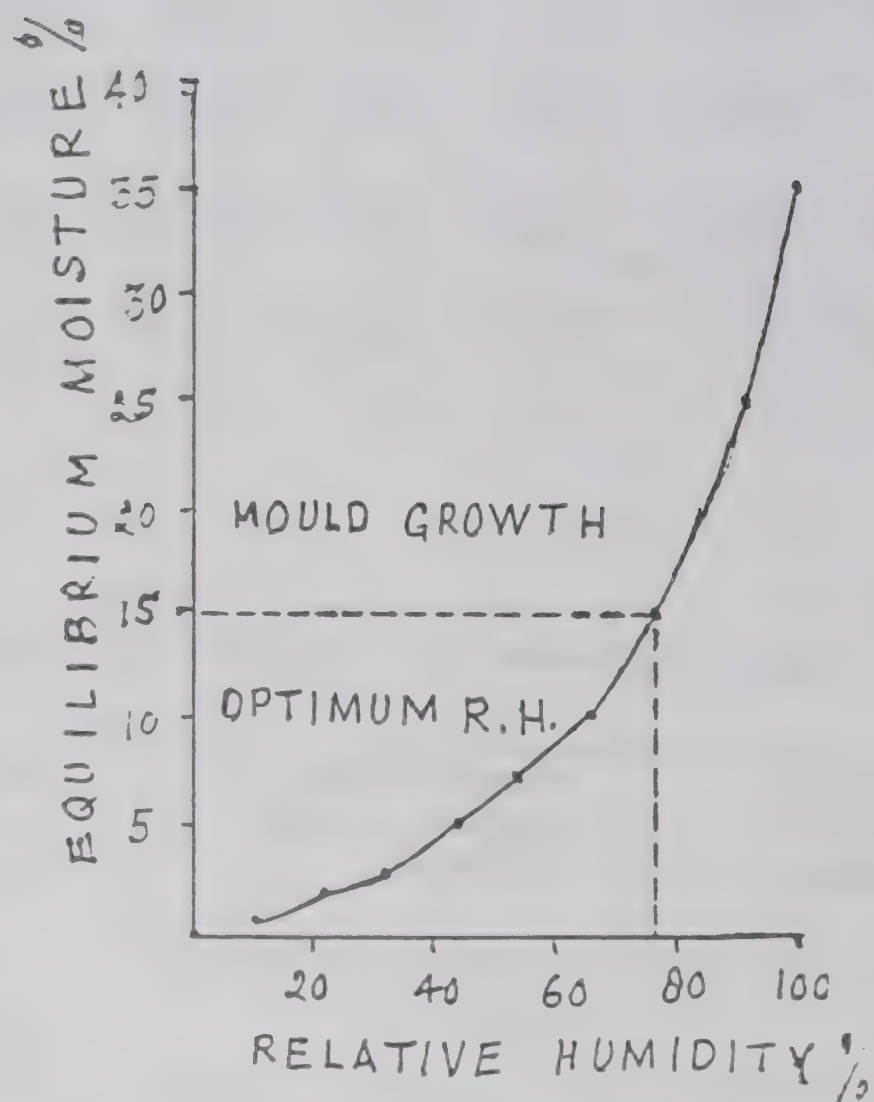


Fig. 1- HUMIDITY - MOISTURE
EQUILIBRIUM CURVE FOR
20% GUAVA PULP BLENDED
AMPAPAR AT R.T.

PHYSIOLOGICAL AND QUALITY CHANGES DURING MINIMAL PROCESSING AND STORAGE OF SHREDDED CABBAGE

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ABSTRACT

Shredded cabbage was subjected to minimal processing in terms of sanitation wash, additive infusion inclusive of calcium, sulphur-di-oxide, benzoate, salting and acidification. The additive treatments were restricted to a level, which maintain the product within the realms of minimal processing. The respiratory drift in pretreated shredded cabbage was restricted compared to the untreated shredded cabbage. Ascorbic acid infusion yielded a product of comparable colour and quality as that of sulphited product but with a lower shelflife. Partial supplementation of SO_2 by ascorbic acid enhanced the shelf stability compared to ascorbic acid alone. The pretreatment and packaging in poly propylene pouches reduced the ascorbic acid losses during storage. As such, the pretreatment schedule comprising of additives, low intensity microwave heating and MAP could result in a product shelflife of 13 to 25 days under ambient and 59 to 85 days under low temperature conditions. The treated product was microbiologically safe with T.P.C. of 10^2 to 10^3 , yeasts and molds at nil to 1×10^1 and absence of Coliforms and psychrophiles.

INTRODUCTION

Minimal processing of cut and trimmed fresh fruits and vegetables is an emerging technology throughout the world and there is growing attention towards minimally processed fresh produce under refrigerated conditions for use as salads and curries. In the Indian context too, minimal processing has its own implications as the products are gaining popularity due to reduced kitchen operations as the inedible portions are trimmed off offering convenience as well as saving in packaging and transportation costs.

The problems associated with minimal processing are characterized by undersirable physiological changes and increased susceptibility to microbial spoilage reducing the

shelflife drastically over the intact fresh fruits and vegetables (USDA, 1984). Berwal (1994) attributed multifactorial lethality of pathogenic microbes to hurdle technology. However HT products may not be essentially minimally processed products. The minimally processed fruits and vegetables have to make use of low degree hurdles with least emphasis on any sort of heat treatment.

A typical minimal process is more a good manufacturing practice with stringent HACCP protocols (Huxsoll and Bolin, 1989) and making use of a preservation approach similar to that of fresh fruits and vegetables involving sanitation wash (Anon, 1988) precooling refrigeration (Barth et. al

1990) and adoption of C.A.P./M.A.P. technologies (Ayhan and Chism 1998). India being a developing country without an established cold chain coupled with an energy crunch needs minimally processed products, which can be stored under ambient conditions. The present study aims at the development of minimally processed shredded cabbage with increased shelflife at ambient as well as at low temperature conditions.

MATERIALS AND METHODS

Raw material: Cabbage (Cultivar *Harirani*) was procured in 30 kg lot for the 6 experimental blocks. Each experiment was replicated thrice. Infected, disproportionate, discoloured as well as cabbage clusters with mechanical injuries were sorted out. Healthy and fresh cabbage

cluster were subjected to removal of outer leaves followed by the sanitation wash.

Sanitation wash: The sanitation wash was carried out in two phases. The first wash was given with chlorinated water (100 ppm) followed by cutting in the form of 1 cm X 4 cm shredded pieces after removing the inedible central portion of the bud. The shreds were once again given a wash in chlorinated water (100 ppm) at pH 7.5.

Pretreatments applied: Subsequent to the sanitation wash the following pretreatments were applied in the given schedule-

T_1 = Shredded cabbage as such (as experimental control).

T_2 = Calcium Chloride dip (2% w/v) \rightarrow Additive infusion (Dip in soak solution comprising of salt 3% + citric acid 0.7%, Potassium Metabisulphite 0.05% and Sodium benzoate 0.1% for 90 minutes) (1:2 dip proportion for product and soak solution) \rightarrow low intensity microwave heating (at level 5 for 1 minute) prepackaging in polypropylene pouches (200 gauge).

T_3 = Same as T_2 without metabisulphite. Subjected to ascorbic acid infusion (200 ppm)

T_4 = Same as T_2 with metabisulphite at 0.025% without ascorbic acid.

T_5 = Same as T_2 with metabisulphite at 0.025% and ascorbic acid infusion (200 ppm).

Analytical Methods : The respiratory activity was monitored

by the continuous carbon-di-oxide trapping method using barium hydroxide followed by acid titration using phenolphthalein as indicator (Loomi and Small 1937). Ascorbic acid was estimated by visual titration using 2,6 dichlorophenol indophenol (Ranganna 1986). Browning and acidity were estimated following the methods given by Ranganna (1986). The browning readings were taken at 420 nm for 67% alcohol extracts (AOAC 1990). The residual SO_2 levels were estimated following the spectrophotometric method described by Pearson (1973).

Peroxidase Activity : Peroxidase activity was assayed colorimetrically by using the method of Mihalyi and Vamos-vigyazo (1975). The reaction mixture contained 1 ml enzyme extract, 5 ml citrate phosphate buffer (0.05 M, pH 5.0) and 1.5 ml of 0.1% hydrogen peroxide. The reaction was initiated by adding 2% ortho-phenylene diamine and the absorbance was read at 450nm and was monitored for 3 minutes. One arbitrary unit of the enzyme was expressed as 0.01-absorbance increment per minute per gram tissue at 450 nm.

Total and reducing sugars were estimated following the titrimetric method involving standard reduction of cupric salt by reducing sugars preceded by acid based inversion of sugars (A.O.A.C., 1990). Reflectance was measured using reflectance meter (Elico), head space oxygen by oxygen analyser with a paramagnetic sensor (Servomex, U.K.) and pH by a pH meter (Toshniwal). The texture of

the shredded cabbage was measured using a shear meter (Chatillon, U.S.).

The analyses were carried out periodically i.e. initial, on the day control samples were terminated and at the end of shelflife for individual pretreated samples as well as for the control samples. Mean values of 6 experimental values of each analysis were drawn and the comparisons were made using the Duncan multiple range test with statistical computer software (Michael Mehony 1986). The experiments were replicated three times during the seasons Feb-March, Sept.-Oct and Dec.-Jan for the consideration of seasonal variations of the fresh produce quality. All the results were expressed as mean values of three seasons.

Microbiological analysis: The pretreated shredded cabbage samples along with the control samples at initial as well as under storage (6°C and ambient conditions 19-37°C) were subjected to microbiological analysis in terms of total plate count, coliforms, psychrophiles and yeasts and molds following the methods recommended by the American Public Health Association (APHA, 1976).

RESULTS AND DISCUSSION

Initial quality and physiological response: The initial quality of the shredded cabbage as shown in Table 1 denotes a comparable quality profile with the intact samples. The shredded cabbage as such showed approximately 4 times the

respiration of intact cabbage as in cut/wounded tissue. However the pretreatments could significantly restrict the rise in respiration to varied levels ($P < 0.05$) for the cut and treated samples compared to the basal respiration of intact and untreated cabbage. The retardation in respiratory drift can be attributed to the stabilisation of the minimally processed product apart from microbial safety imported. The individual effects of additives on respiration rates of shredded cabbage showed a significant retardation ($P < 0.05$) in the respiratory activity of the tissue. Earlier reports also show reduced respiration rate as affected by calcium infusion (Tirmazi and Wills, 1981) and the respiratory retardation by sulphitation can be attributed to inactivation of enzymatic catalytic mechanism (Roberts and Mcweay, 1972).

As far as the prepackaging is concerned amongst the conventional polyethylene and propylene the latter protected better in terms of colour and texture of the product. The modified atmosphere developed within the package was monitored wherein the residual oxygen concentration ranged from 15.6 to 18.9 % against a value of 5.9 to 7.8 for the untreated samples (after 8 hours of storage) indicating slower respiratory input. The treated samples did not show bulging of pouches or alcohol accumulation within the material indicating the absence of any anaerobic process.

The results of peroxidase activity indicated suppression of peroxidase activity with increasing levels of

sulphitation (Table 1). Desrosier and Tresser (1977) reported inhibitory effects of sulphitation on the levels of peroxidase. The results show the physiological stabilisation by the additive treatment along with higher retention of ascorbic acid and texture compared with the control samples ($P < 0.05$).

Sulphitation of vegetables in minimal processing where the vegetables are used as salads is still controversial. This is largely due to increasing concerns of asthmatics (Taylor et al 1986). For this reason the use of sulphites has been restricted in minimally processed, trimmed/ cut fruits and vegetables (Anon, 1990) in the developed countries. The study shows that partial substitution of SO_2 by ascorbic acid is helpful in restricting the enzymatic browning besides restricting the residual SO_2 level (Table 1). Ascorbic acid infusion singly was found to be not as effective as in the case of combination use with regard to browning of the product on processing. However the infusion of ascorbic acid could compensate for the ascorbic acid loss during processing and storage and satisfactory retention of ascorbic acid was achieved due to the fortification. The texture and chlorophyll losses observed both under ambient and low temperature conditions can be attributed to the aqueous soak treatments in the case of texture and acidification in the case of chlorophyll. However these treatments were found to ensure stabilisation of the product in terms of restricted metabolism as well as

microbiological safety.

Storage stability and sensory quality: The results (Tables 2 and 3) show that the pretreatments selected for the study are effective in imparting shelf stability to the product in the range of 13-23 days under ambient and 59 to 85 days under low temperature conditions. The pretreated samples showed a slower respiratory drift compared to control samples indicating stabilised metabolism against the wound stress caused by the trimming and cutting operations applied on the vegetable tissue. An initial SO_2 level at 109 ppm was found to render better shelf stability to the product compared to the lower levels or partial substitution by ascorbic acid. The combined effect of acidification and salting without causing drastic changes in the sensory quality along with restricted use of SO_2 and benzoate could extend the shelf life of shredded cabbage. Rocha et al (1998) reported beneficial effects in terms of restricted discolouration by the use of ascorbic acid and restricted textural losses by the use of calcium salts as an additive. In the study it was found that sulphitation due to its multidimensional role in terms of antimicrobial activity and as an effective antibrowning agent of enzymatic as well as nonenzymatic browning tendency (Wedzicha, 1981) can be used judiciously depending on the end use of the product. The shredded cabbage for curry preparations can be subjected to low dose sulphitation (50-70 ppm) where cooking takes care of the residual SO_2 but salad

preparation can be made with ascorbic acid infusion with/without SO_2 depending on the required shelflife and market requirements. The samples subjected to ascorbic acid infusion showed higher residual ascorbic acid at the end of shelf life ($p < 0.05$) compared to the untreated (control) samples.

Microbiological profile: The microbiological quality is of paramount importance in minimally processed products due to the lack of lethal thermal treatments. The untreated shredded cabbage as such showed initial counts of T.P.C., coliforms and yeasts and molds at 36×10^4 , 300×10^3 and 7×10^2 C.F.U./g respectively. On the contrary the treated samples (inclusive of sulphitation) showed T.P.C at 1 to 5×10^1 C.F.U./g without any coliforms, yeasts and molds. The pretreated samples without sulphitation showed higher counts with T.P.C., coliforms, yeasts and molds at 21×10^2 , 12×10^2 and 5×10^1 C.F.U./g respectively indicating the role of restricted sulphitation in reducing the microbial loads besides restricting enzymatic/non enzymatic browning of the product.

It was also observed that the microbial counts in terms of T.P.C., coliforms, yeasts and molds reach zero levels in the treated samples due to the functioning of the microbial hurdles applied excepting the unsulphited samples which maintained residual T.P.C. levels of 18×10^1 C.F.U./g under ambient temperature and 15×10^1 C.F.U./g under low temperature respectively. The low temperature stored samples did not show psychrophiles indicating the consumer safety for

the minimally processed product. The pretreatments were as such found effective in restricting the microbial loads as microbial hurdles viz. benzoate, SO_2 and acidification were included. Another factor contributing towards decrease in microbial load during the processing is the removal of surface moisture by low intensity microwave heating. Though an acidified product ($\text{pH} < 4.5$) this unit operation can be critical point in restricting the microbial loads. Microwave heating for a shorter duration does not increase the core temperature of the tissue above 50°C (Ramaswamy and Pillet Will 1992) which does not damage the sensory attributes of the product.

Product utility and commercial feasibility : The minimally processed vegetables for use as salads and curry preparation are the need of the hour and the shredded cabbage developed comes handy for the purpose. The additives were standardized to the minimal level and options include supplementation of SO_2 by ascorbic acid. The pretreatments give the needed flexibility in terms of shelf stability under low temperature as well as under ambient conditions and also can be used where cold chain facility is inadequate. Therefore the protocol is as such suitable for the tropical developing countries which largely depend on the small scale and cottage industry.

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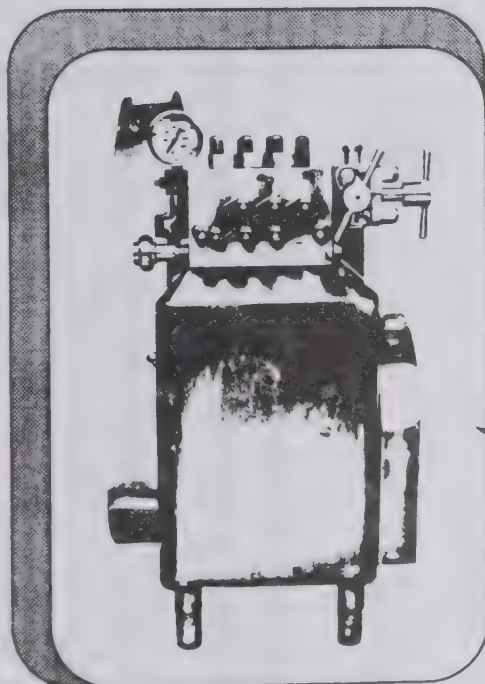
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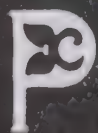
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Table 1. Physico-Chemical characteristics of minimally processed shredded cabbage

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅
Ascorbic acid(mg/100g)	64.8±2.2	56.5±2.1	1404±1.9	45.3±1.9	134.1±2.7
Salt (%)	ND	1.01 ± 0.06	1.02 ± 0.07	1.03 ± 0.1	1.08 ± 0.05
Acidity (% Citric acid)	0.01 ± 0.002	0.44 ± 0.02	0.47 ± 0.03	0.5 ± 0.04	0.46 ± 0.03
Reducing sugars (%)	4.8 ± 0.18	4.3 ± 0.2	4.1 ± 0.25	4.1 ± 0.2	3.9 ± 0.15
Moisture (%)	88.7 ± 0.9	90.2 ± 0.7	91.4 ± 1.04	91.5 ± 0.6	91.2 ± 0.8
SO ₂ (ppm)	ND	71 ± 4.3	ND	61.1 ± 3.1	57.2 ± 3.9
Chlorophyll (mg/100g)	1.9 ± 0.12	0.73 ± 0.11	0.65 ± 0.08	0.62 ± 0.07	0.71 ± 0.09
Respiration (MgCO ₃ /kg/hr)	154.3 ± 3.7	91.7 ± 2.5	1123 ± 3.5	96.5 ± 2.2	98.5 ± 2.4
Reflectance (%)	48.5 ± 1.3	58.3 ± 2.3	46 ± 1.9	52.5 ± 0.8	54.5 ± 1.6
Texture (Kg)	2.1 ± 0.04	1.9 ± 0.08	1.3 ± 0.04	1.7 ± 0.1	1.65 ± 0.07
Browning (OD at 420 nm)	0.21 ± 0.02	0.06 ± 0.01	0.16 ± 0.02	0.12 ± 0.01	0.1 ± 0.01
PH	6.45 ± 0.08	4.37 ± 0.03	4.4 ± 0.06	4.32 ± 0.04	4.42 ± 0.05
Peroxidase activity (Arbitrary units/ lg/min)	1498	211	817	607	612

Interactions of pretreated samples with control - significant at $P < 0.05$

T₁ to T₅ are the pretreatments applied as described in the methods.

Table 2. Data on storage stability of minimally processed shredded cabbage at ambient temperature (22-23°C)

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅
Respiration (MgCO ₂ /kg/hr)	26.4±2.5	112.2±2.6 (43.1±2.3)	129.3±1.9 (31.4±2.6)	108.2±3.1 (29.9±2.1)	103.6±2.9 (38.1±1.9)
Ascorbic acid (mg/100g)	33.8±2.3	52.8±1.6 (41.6±2.1)	81.2±1.7 (46.3±2.4)	41.7±2.4 (33.2±2.4)	89.4±2.1 (55.6±1.9)
Reflectance (%)	3.2±1.4	54.3±1.9 (53.5±1.6)	43.2±1.5 (37.5±1.8)	47.5±1.5 (41.3±1.2)	49.3±1.7 (42.5±1.1)
Texture (Kg)	ND	1.8±0.09 (1.25±0.07)	1.2±0.06 (1.1±0.05)	1.45±0.09 (1.2±0.08)	1.5±0.08 (1.3±0.1)
Browning (OD at 420nm)	0.34±0.03	0.12±0.02 (0.17±0.01)	0.24±0.01 (0.29±0.02)	0.19±0.01 (0.25±0.01)	0.16±0.02 (0.28±0.02)
Head space O ₂ Conc. (%) (After 8 hrs)	5.9±0.2	18.4±0.2	15.6±0.3	16.3±0.3	17.3±0.2
Shelflife (days)	3	23	13	15	18

Interactions of pretreated samples with control - significant at P<0.05

Unbracketed values represent those at the end of control shelflife

Bracketed values represent those at the end of shelflife and individual treated samples.

T₁ to T₅ are the pretreatments applied as described in the methods.

Table 3. Data on storage stability of minimally processed shredded cabbage at 6°C±1

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅
Respiration (MgCO ₂ /kg/hr)	18.2±1.6	51.1±1.8 (24.2±1.5)	8.2±2.2 (22.7±2.1)	60.6±1.9 (26.8±1.5)	67.1±1.7 (24.9±1.8)
Ascorbic acid (mg/100g)	18.1±1.4	56.7±1.7 (31.2±1.6)	86.2±1.5 (62.3±2.2)	51.3±1.8 (28.2±1.9)	86.4±2.1 (64.7±1.4)
Reflectance (%)	ND	1.8±0.07 (1.4±0.05)	1.3±0.05 (1.1±0.09)	1.5±0.09 (1.3±0.05)	1.5±0.08 (1.35±0.06)
Texture (Kg)	39.0±1.3	57.5±1.9 (51.3±1.6)	48.0±1.5 (40.5±1.3)	49.5±0.9 (41.0±1.2)	52.5±1.2 (44.3±1.8)
Browning (OD at 420nm)	0.26±0.02	0.08±0.02 (0.17±0.01)	0.17±0.01 (0.28±0.02)	0.13±0.02 (0.28±0.01)	0.11±0.01 (0.25±0.02)
Head space O ₂ Conc. (%) (After 8 hrs)	7.8±0.3	18.9±0.2	16.6±0.2	17.6±0.2	18.1±0.3
Shelflife (days)	15	85	59	64	70

Interactions of pretreated samples with control - significant at P<0.05

Unbracketed values represent those at the end of control shelflife

Bracketed values represent those at the end of shelflife and individual treated samples.

T₁ to T₅ are the pretreatments applied as described in the methods.

GRAPE WASTE AS A SOURCE OF TARTRATES

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ABSTRACT

The possibility of extraction of tartrates from Grape wastes obtained from vineyards and grape processing industry was explored. Wastes like leaf blade, peteole, tender shoots and tendrils, the rachis, pedicels and the cull raisins are all good sources for tartrate extraction. While the total tartrate content was high in peteole, rachis and pedicel varying from 7.15 - 8.7% on dry weight basis in *Thompson seedless* variety and 9.75% in *Anab-e-shahi*, it was 2.14% and 4.87% in leaf blade and tender shoots of the above varieties respectively. Tartrates were extracted and precipitated as Calcium tartrate and the yields ranged from 1.5 to 5.6%. Calcium tartrate was decomposed with sulphuric acid to get tartaric acid which was recovered by crystallisation.

INTRODUCTION

Tartaric acid and its derivatives viz., potassium hydrogen tartrate (cream of tartar), Potassium sodium tartrate (Rochelle salt) and Potassium antimony tartrate (Tartar emetic), which are together generally known as tartrates find several food, pharmaceutical and industrial uses. These tartrates are commercially prepared from the byproducts of wineries viz., Argol, which forms the major basic raw-material; press cakes from grape juice unfermented or partly fermented (marcs and pomace) and Lees, which are the dried slimy sediments in wine fermentation vats (Geofrey Martin, 1952). These rawmaterials are suitably treated to get the required tartrate (Celmer, 1943). Tartaric acid can also be prepared synthetically by bacterial fermentation of carbohydrates using *Acetobacter* and *Gluconobacter* species

(Murray Mo Young, 1985).

Tartaric acid and its derivatives are at present imported into India. There is no commercial production of tartrates in our country due to limited availability of argol, as there is very low production of wine from grapes. Therefore, alternate sources of raw materials are being searched for tartrate extraction. Some of them are tamarind leaves (Balasubramanian et al., 1973) and pulp (Batham and Nigam, 1953; Wealth of India-Raw Materials, 1976). Tamarind pulp, though rich in tartrates (8-18%) is very costly for extraction of tartaric acid. Its leaves are reported as a good source for tartrates extraction (Balasubramanian et al., 1973), but its collection is difficult. Tamarind being an evergreen tree, stripping of its leaves is deleterious to the plant and affects the yield of fruit.

The principle acid of grape is tartaric and together with malic it constitutes 90% of the total. At maturity the acidity of the fruit varies from 0.3 to 1.2% calculated as tartaric acid. Grape is one of the few plants in which tartaric acid is synthesized in the leaves (Winkler, 1972). Not only the grape juice but also the rachis and pedicels of grape bunches, the leaves, peteoles and tender growing parts of the plant contain tartrates. Large quantities of leaves peteoles and tender growing parts of the plant are available as waste when the vines are pruned twice a year in October and April as part of the regular cultural practices. The rachis and pedicels, cull fruits and cull raisins are available as waste in the raisin processing industry. The present communication gives an idea on the possibility of using these wastes as a source for extraction of tartrates.

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MATERIALS AND METHODS

The pruning wastes from vineyards viz., leaf blades, peteoles and tender shoots belonging to two varieties of *Anab-e-shahi* and *Thompson seedless* were obtained from the Grape Research Station, APAU, Rajendranagar and the processing waste of *Thompson seedless* variety viz., pedicels, rachis and cull raisins were obtained from M/s. Malligi Foods and Chemicals, Hospet. The tartrate content in these samples were analysed as per AOAC (1960) method.

Extraction of Tartrates: Calcium tartrate is an intermediate product for preparation of tartaric acid and therefore a method was standardised to extract the tartrates from these wastes and then precipitate it as calcium tartrate. The plant materials were first soaked in 10 times their weight of water for one hour, boiled for half an hour and the extract obtained was filtered through cloth. Similar two more extracts were taken and the combined extracts were filtered through a bed of supercel. The pH of the extract was adjusted to 4.5 by addition of calcium hydroxide. Then excess of Calcium chloride was added (excess Calcium chloride is tested with ammonium oxalate) and allowed to settle overnight. The supernatant was decanted and the Calcium tartrate was collected, washed with water and then dried.

Conversion of Calcium tartrate to Tartaric acid: The Calcium tartrate

obtained was wetted with equal quantity of water and made into a slurry. To this slurry 80% sulphuric acid was added to get a pH of 0.8. The whole material was kept stirring and then allowed to settle overnight. Then it was filtered over No. 1 filter paper under vacuum. The residue was extracted two to three times with water and the filtrates were combined and concentrated under vacuum and then stored in a refrigerator overnight for crystallisation. After recovering the crystals, the mother liquor was concentrated once again and allowed for crystallization. Three to four crops were likewise taken. The recovered tartaric acid crystals were washed with jet of water to improve the colour and dried by blowing hot air.

RESULTS AND DISCUSSION

The total tartrate content in different vegetative parts of *Anab-e-shahi* and *Thompson seedless* was varying between 2.78 to 9.75% and 2.14 to 7.15% respectively. Similarly the total tartrate content in rachis & peteole and cull raisins of *Thompson Seedless* variety obtained from raisin processing wastes was 8.7% and 5.16% respectively (Table 1). The recovery of Calcium tartrate from different grape wastes ranged from 1.5 to 5.6% (Table 2). The conversion of tartaric acid was 70% of the calcium tartrate, which is 88% of the theoretical value.

The results showed that the

peteole, rachis and pedicels, the cull raisins and the leaf blade are good sources for extraction of tartrates.

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Table-I. Tartrate content (%) of Grape Wastes (on dry weight basis)

Plant Part	<i>Anab-e-shahi</i>	<i>Thompson seedless</i>
<u>Leaf Blade</u>		
Cream of tartar	2.77	2.06
Free tartaric acid	2.10	0.08
<u>Peteole</u>		
Cream of tartar	6.02	1.70
Free tartaric acid	3.73	5.45
<u>Tender Shoots</u>		
Cream of tartar	2.78	1.08
Free tartaric acid	0	1.08
<u>Rachis and pedicel</u>		
Cream of tartar	-	8.7
Free tartaric acid	-	0
<u>Cull Raisins</u>		
Cream of tartar	-	2.23
Free tartaric acid	-	2.93

Table-II. Recovery of Tartrates as Calcium Tartrate from different Grape Wastes (on dry weight)

Grape waste	Variety	% yield of Calcium tartrate
Leaf Blade	<i>Anab-e-shahi</i>	1.5
Peteol	<i>Anab-e-shahi</i>	5.6
Cull raisins	<i>Thompson seedless</i>	2.5
Pedicel	<i>Thompson seedless</i>	4.0
Rachis and pedicels	<i>Thompson seedless</i>	4.3

EFFECT OF ORGANIC ACIDS ON QUALITY OF OIL-FREE EGG PICKLE

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ABSTRACT

Present investigation deals with effect of marinating boiled chicken eggs in selected organic acids (lactic, citric and tartaric) in combination with common salt and sodium benzoate on variation in mass, pH, acidity and salt content of pickling solution as well as albumen and yolk. Effect of duration of storage of eggs pickled in selected acid solutions on the sensory quality of the product was also investigated. Results indicated that mass of eggs decreased during pickling due to loss of moisture and soluble solids. Equilibrium in pH, acidity and salt content was attained in 7 days of pickling/marination. Acidity and salt content of albumen and yolk increased while pH decreased during pickling. Lactic acid pickled eggs were preferred the most by sensory panelists followed by tartaric - and citric - acid ones. Eggs pickled in lactic acid could be stored for more than 4 months. The product was found to be safe with a total plate count of less than 2580 per g of pickled eggs.

INTRODUCTION

Poultry industry in India has grown tremendously during the last two decades. Annual egg production has increased from 2,340 million in 1960 to 26,000 million at present¹. Eggs have a very high nutritive value. The Nutritional Committee of the Indian Council of Medical Research has recommended one egg per person per day to meet the nutritional requirements of animal protein. Eggs are now considered vegetarian and their acceptability in the vegetarian diet is gradually increasing.

Pickling is an effective method of preservation of eggs for later consumption, especially during the lean periods. It is a commercial feasible method of marketing hard cooked egg product by enhancing

its taste through pickling. Several researchers have reported on the pickling of chicken and quail eggs in brine/vinegar as well as oil²⁻⁹. Many consumers do not like the astringent flavour of vinegar as well as floating oil in case of oil pickles. People are also very much fat conscious and prefer foods with minimum of fat/oil. With this in view the present investigation was undertaken to develop an oil-free chicken egg pickle using acids other than acetic acid. No systematic study has been done on this problem so far.

MATERIALS AND METHODS

Fresh chicken eggs were procured from the local market and held at 5°C for 48 h prior to cooking. Eggs were placed in water, brought to simmering temperature and allowed to cook for 15 min

and cooled immediately under running tap water for 2 min³. Hard cooked eggs were peeled and marinated in solutions containing salt, acid and preservative and were allowed to equilibrate for 7 days. Three different compositions of the solution were investigated: (i) 10% NaCl+3% lactic acid + 1000 ppm sodium benzoate; (ii) 10% NaCl + 3% citric acid + 1000 ppm sodium benzoate; and (iii) 10% NaCl +3% tartaric acid +1000 ppm sodium benzoate. During the equilibration period, pH, acidity, salt concentration and mass of eggs were recorded daily. After 7 days, the eggs were removed from the solution, drained and transferred to glass jars. The recipe for the preparation of pickle is given in Table 1.

The oil was heated in a frying pan and green curry stuff was fried

till the mixture turned light brown. Seasonings and 600 ppm sodium benzoate were then added and the fried mixture cooled. Upon cooling, the fried spice mixture was transferred to the glass jars containing the eggs. The jars were sealed and placed at room temperature (20 to 28°C) to study the shelf life.

Total plate count of egg pickle was determined by the pour plate method¹⁰. A panel of five semi-trained panelists evaluated the product for appearance, texture, flavour and overall acceptability. A four point hedonic scale was used to evaluate the product at 15 days interval for more than 4 months. The data were statistically analyzed to ascertain the statistical significance¹¹.

RESULTS AND DISCUSSION

Variation in mass of pickled eggs during the equilibration period showed a rapid decrease during the first 3 days (Fig. 1). The mass loss is attributed to both reduction in moisture content as well as leaching of soluble solids from the eggs. The pickling solution became turbid due to leaching of solids. Eggs pickled in the citric acid solution showed maximum mass loss followed by tartaric - and lactic - acid.

Variation in pH of both albumen and yolk fraction of the pickled eggs is shown in Fig. 2. Rapid decrease in pH of albumen was observed during first day of pickling and the variation was not substantial thereafter. Decline in pH of albumen was maximum in

tartaric acid solution. Variation in pH of yolk was gradual indicating that hydrogen ions took longer time to diffuse into yolk located in the center of egg. The pH of pickling solution changed as the hydrogen ions from the solution diffused into the egg (Table 2). There was a steep rise in pH of the solution up to 3rd day, gradually attaining the equilibrium value of 3.3 on the 7th day in case of lactic acid. The trend in increase of pH for citric - and tartaric - acid was similar but the equilibrium values were lower than those for lactic acid solution.

Data on variation in acidity of various pickling solutions (Table 2) as well as albumen and yolk (Fig. 3), revealed that the acidity of the pickling solutions declined rapidly on first day followed by a slow and uniform decline till equilibrium was attained on the 7th day. Similar to pH behaviour, the acidity was lowest in case of tartaric acid solution while it was same for lactic - and citric - acid solutions. Acidity of both albumen and yolk increased consistently during the equilibration period and were at similar levels at the end of 7th day.

The salt content of the pickling solutions decreased faster during the first two days followed by a slow and uniform decline thereafter (Table 2). Salt content at equilibrium was almost the same for lactic and tartaric acid solutions while it was higher for citric acid solution indicating slow diffusion of salt in case of the citric acid pickling. The increase in salt content of albumen was more on

the first day followed by a gradual increase, reaching the equilibrium value on 7th day (Fig. 4). On the other hand, there was no increase in salt content of yolk up to 3rd day. Salt content of yolk, however, increased consistently from 3rd to 7th day. Further, the salt content of yolk was considerably lower than that of albumen.

The mean sensory values for effects of storage and type of organic acid used on the appearance, flavour, texture and overall acceptability have been reported in Tables 3 and 4. The effect of both acid and storage time was significant for all the parameters. Lactic acid pickled eggs stored best and had significantly higher values for appearance, flavour, texture and overall acceptability as compared to citric - and tartaric acid. Citric acid samples scored the lowest for appearance, texture and overall acceptability while flavour score was the lowest for tartaric acid sample. The data indicated that the texture and appearance was better related to overall acceptability as compared to flavour. This is contrary to the general observation that flavour is the most sensitive parameter determining the overall acceptability of a product by the consumer. The pickle was shelf stable in pearl pet jars for more than 4 months. The lactic acid pickled eggs were the best followed by tartaric acid ones. The samples treated in citric acid solution were the least acceptable because of softer texture and poor appearance.

Storage did not have significant effect ($P>0.05$) on appearance up to 45 days, flavour for up to 30 days, texture for up to 60 days and

overall acceptability up to 30 days. The appearance scores decreased slightly after 60 days followed by a significant decrease after 126 days in case of citric - and tartaric - acid samples. The flavour scores remained almost constant after the initial decline. The texture score also remained almost the same after the initial decrease observed after 15 and 30 days storage. As far as acid effect is concerned, the texture scores did not differ significantly between lactic - and tartaric - acid samples. The overall acceptability scores remained almost the same after the initial decline in case of lactic - and citric - acid pickled eggs but the decrease was significant after 60 and 126 days in case of tartaric acid samples. Therefore as far as storage at ambient temperature is concerned, tartaric acid pickle had lower shelf life of only 45 days as compared to more than 4 months for lactic acid and only 30 days for citric acid samples.

There was a slow decrease in the total plate count (Table 5) over the storage period of 126 days which could be attributed to the

acidic nature of the product. A significantly greater plate count in the beginning may be due to microbial load of various spice-ingredients. It is obvious from the values of the total plate count that the product is quite safe.

CONCLUSIONS

1. The weight of eggs declined during pickling due to loss of moisture content and soluble solids.
2. Equilibrium in pH, acidity and salt content was achieved in 7 days of marination.
3. Acidity and salt content of albumen and yolk increased while pH decreased during pickling
4. Lactic acid pickled eggs were preferred the most followed by tartaric - and citric-acidones.
5. The eggs pickled in lactic acid could be stored for more than 4 months without appreciable deterioration in the overall acceptability.

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Table 1 - Recipe for preparation of oil free egg pickle for 36 eggs.

1. Green stuff:		
	Garlic	50g
	Ginger	50g
	Onion	100g
2. Seasonings:		
	Cinnamon	5g
	Clove	10g
	Coriander powder	50g
	Chilli powder	50g
	Black pepper	10g
	Turmeric powder	30g
	Cumin seeds	10g
3. Mustard oil		50 ml (just enough to fry the spices)

Table 2 Temporal variation of pH, acidity and salt content of pickling colutios (n=3)

Parameter	Sample Prepared in	Days							
		0	1	2	3	4	5	6	7
pH	Lactic acid	2.4	2.6	2.9	3.1	3.2	3.2	3.3	3.3
	Citric acid	2.1	2.4	2.7	2.7	2.8	2.8	2.8	2.8
	Tartaric acid	1.7	2.2	2.4	2.4	2.4	2.5	2.5	2.5
Acidity	Lactic Acid	2.80	1.87	1.72	1.66	1.63	1.62	1.61	1.60
	Citric Acid	2.60	1.83	1.80	1.80	1.77	1.72	1.60	1.56
	Tartaric Acid	2.90	1.90	1.80	1.70	1.57	1.51	1.43	1.42
Salt content	Lactic acid	9.50	7.73	6.62	6.34	5.94	5.86	5.70	5.63
	Citric acid	9.50	8.03	7.72	7.30	7.10	6.90	6.65	6.54
	Tartaric acid	9.50	7.47	7.31	7.14	6.42	6.20	5.71	5.53

Table 3 Effect of storage at ambient temperature in pearl pet jars on the sensory attributes of pickled egg (n=45)

Attribute	Days					
	0	15	30	45	60	126
Appearance	3.50 ^a	3.30 ^b	3.16 ^b	3.08 ^{bc}	2.91 ^c	2.95 ^c
Flavour	3.08 ^a	3.08 ^a	3.08 ^a	2.50 ^b	2.50 ^b	2.41 ^b
Texture	3.58 ^a	3.58 ^a	3.41 ^{ab}	3.26 ^b	3.18 ^b	2.83 ^c
Overall acceptability	3.08 ^a	3.08 ^a	3.08 ^a	2.50 ^b	2.50 ^b	2.41 ^b

Means superscripted with the same alphabet in rows are not significantly different ($P>0.05$)

Table 4 Effect of acid type at ambient temperature on the quality attributes of the pickled egg. (n=90)

Attribute	Lactic Acid	Citric Acid	Tartaric acid
Appearance	3.25a	2.80b	3.00b
Flavour	3.05a	2.50b	2.75c
Texture	3.35a	3.15b	3.31ab
Overall acceptability	3.05a	2.45b	2.85c

Means superscripted with the same alphabet in rows are not significantly different ($p>0.05$)

Table 5 Effect of storage at ambient temperature on total plate count ($\times 10^3$) per gram for pickled egg. (n=3)

Attribute	Days					Mean*
	15	30	45	60	126	
Lactic Acid	4.4 ^a	2.9 ^b	2.72 ^b	2.65 ^b	2.58 ^b	3.05 ^a
Pickled egg						
Citric Acid	4.0 ^a	2.3 ^b	2.3 ^b	2.35 ^b	2.31 ^b	2.65 ^b
Pickled egg						
Tartaric Acid	3.0 ^a	2.3 ^b	2.3 ^b	2.1 ^b	2.33 ^b	2.44 ^b
Pickled egg						

Mean superscripted with the same alphabet in rows are not significantly different ($p>0.05$)

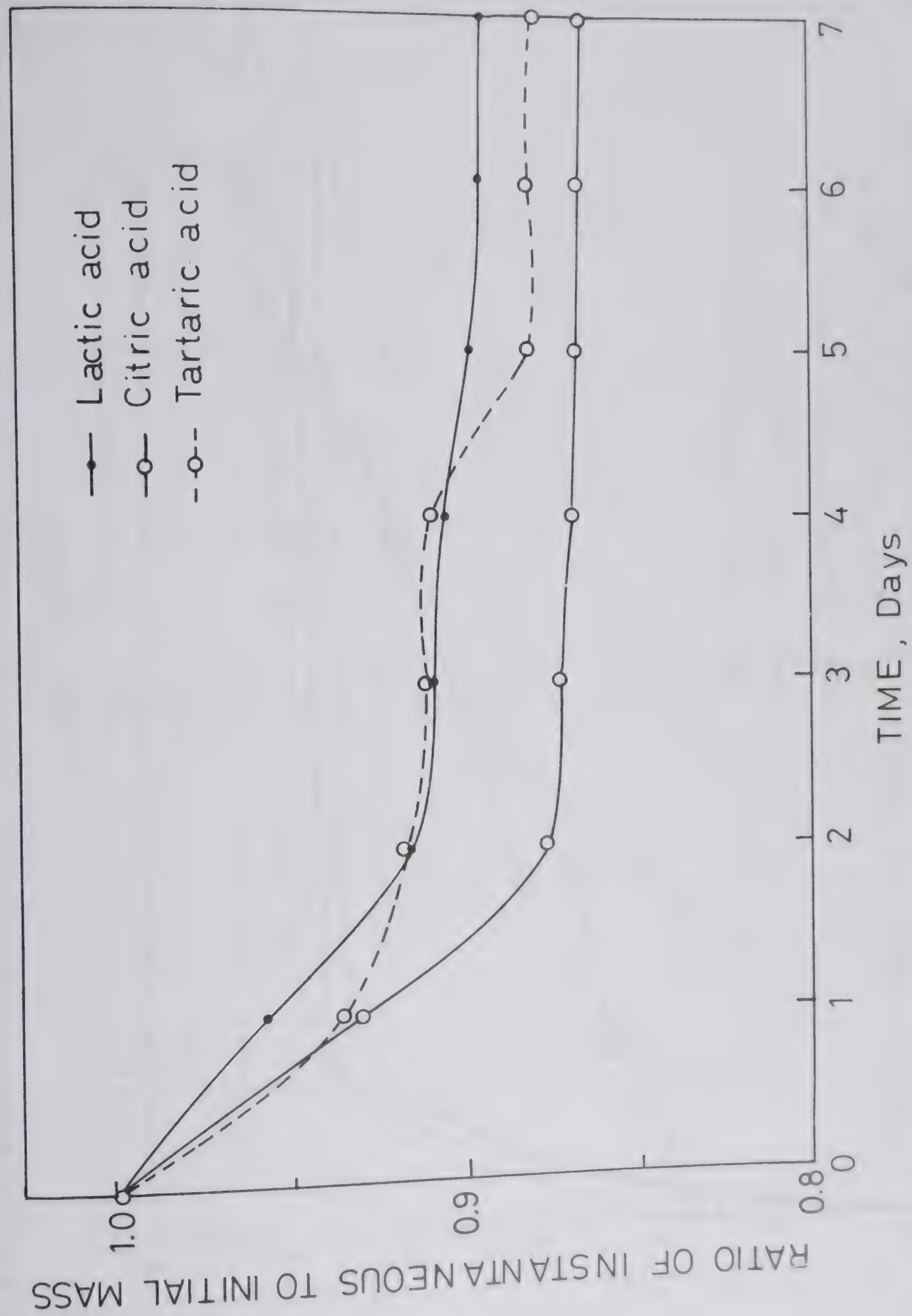


FIG.1 Reduction in mass of pickled eggs with pickling duration.

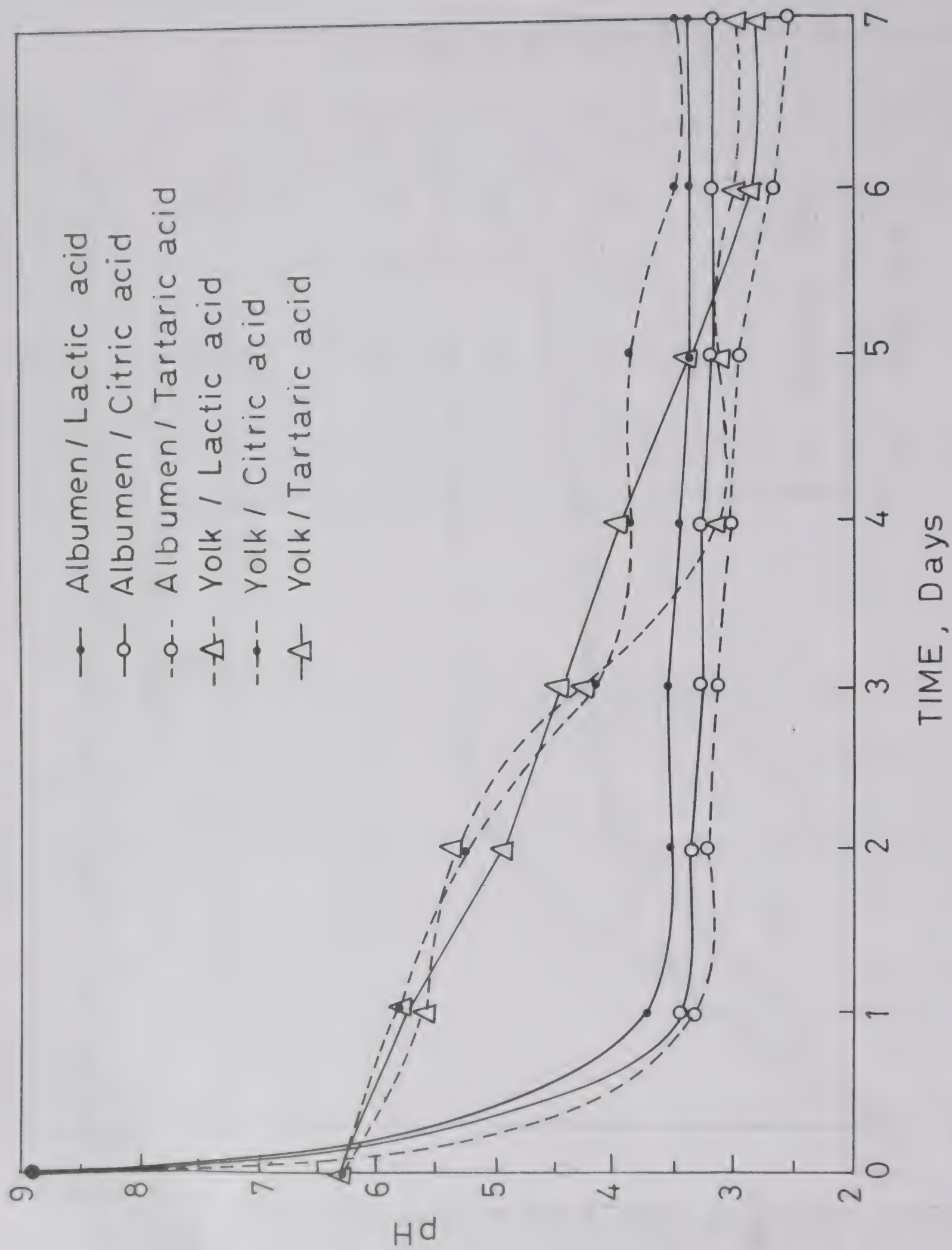


FIG.2 Variation in pH of egg albumen and yolk with pickling duration.

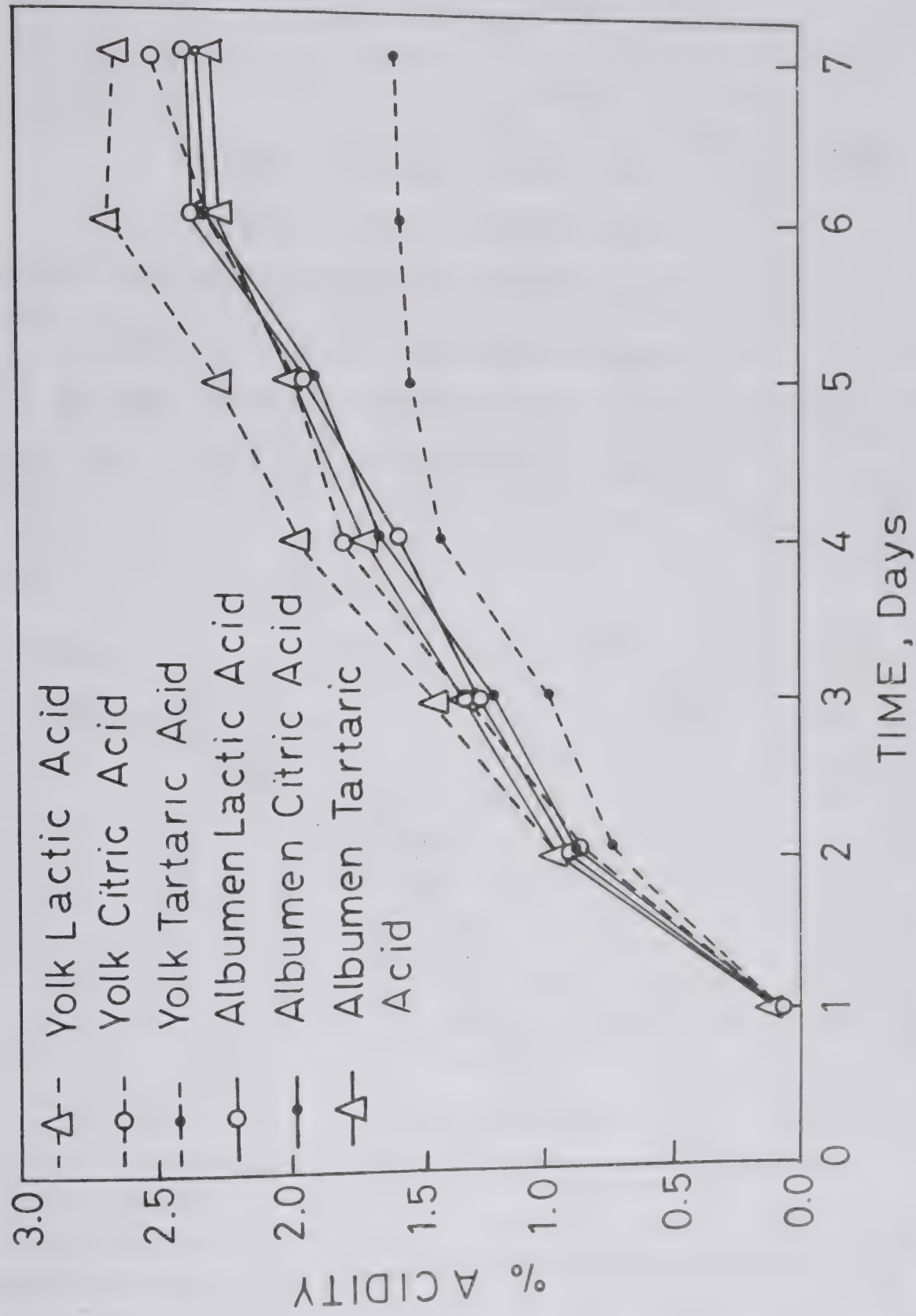


FIG.3 Variation in percent acidity of egg albumen and yolk with pickling duration .

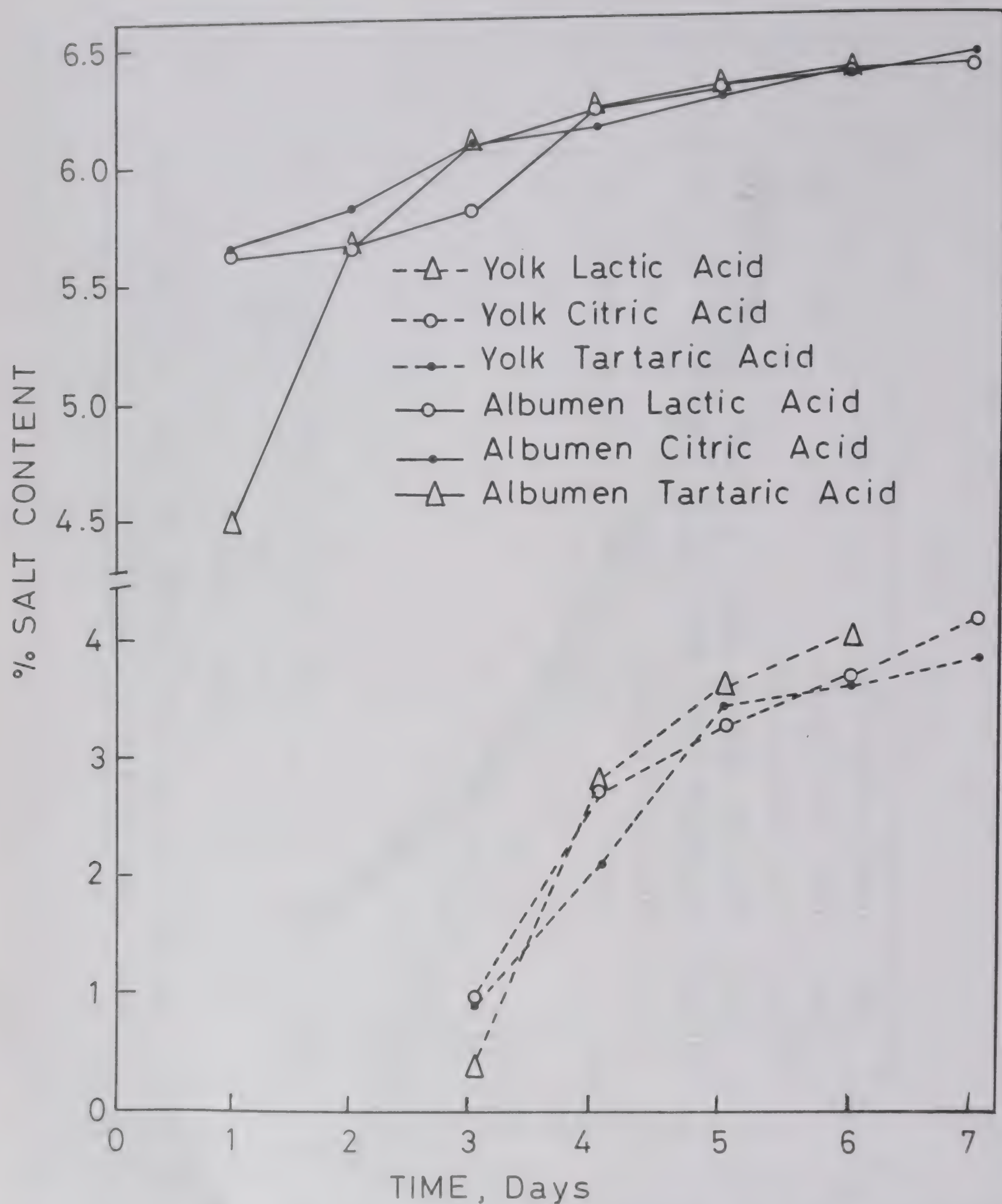


FIG.4 Variation in percent salt content of egg albumen and yolk with pickling duration.

PROCESSING AND QUALITY EVALUATION OF READY-TO-SERVE WATERMELON NECTARS

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ABSTRACT

Watermelon fruits (*Citrus lanatus*), Crimson sweet var. were processed to ready-to-serve pasteurised nectars (85°C for 20min) with varying levels of °Brix (15, 20, 25), xanthum gum % (0.10, 0.20, 0.25), citric acid % (0.10, 0.15, 0.20, 0.30) and fortified with 1.0% ascorbic acid with or without addition of potassium sorbate. Sensory evaluation indicated that watermelon nectar which consisted of 20° or 25°Brix, 0.20% xanthum gum, 0.15% citric acid or pH 3.75-3.87 was most highly ranked and thus preferred by panelists, than nectar blends of watermelon with mango. On storage for 5 weeks at 20-25°C there were no significant quality changes in consistency and total soluble solids (°Brix). However there were slight reduction in the pH, fading of colour and loss of ascorbic acid with negligible growth of microorganisms.

INTRODUCTION

Watermelon, *Citrullus vulgaricus* (syn. *C. lanatus*) is the edible fruit of the family Cucurbitaceae. The fruit is known to have originated in Tropical Africa, but is now cultivated throughout the warmer parts of the world (Teotia et al, 1984). In the Caribbean, as in Trinidad and Tobago, watermelon production tends to be seasonal with abundant supply during the dry season (January to June) and is usually grown for the fresh market. The wet season varieties are not desirable, as they tend have high water content and low sugar content (Doodnath, 1998). The principal requirements for good eating quality are flesh crispness, good flesh colour and sweetness (Teotia and Ramakrishna, 1984). The fruits are

harvested when the flesh is sweet, but not overripe as they tend to become mealy and stringy (Yamuguchi, 1983). As reported by Gowda and Jalali (1995), the use of watermelons for processing has not received much attention except for a few earlier reports. Tropical juices are used in nectars or juice-based drinks, particularly as an ingredient in mixed fruit drinks (Hooper, 1995).

Crandall and Kesterson (1981) reported that the physical composition of watermelon fruits consisted of 41.0% juice, 8% pulp, 1% seeds and 50% rind on wet weight basis, with 95.7% moisture content. Preliminary work has been reported on the packaging and preservation of watermelon juice in cans and bottles (Ghosh et al., 1982). Saini and Bains (1994)

devised a method for the mechanised production of watermelon juice using two cultivars, *H-23* and *Shipper*, while Gowda and Jalali (1995) worked on watermelon fruits of the *Arka Manik* variety in the production of a ready-to-serve spice-based beverage. Uddin and Najundaswamy (1982) processed the watermelon pulp into bottled and canned juices which were acceptable up to 15 days storage at room temperature (25-28°C). The objectives of present study were to utilise watermelon fruits in the production of watermelon nectars or blended watermelon/mango nectars, which would remain in suspension and be organoleptically preferred. The changes in physicochemical, sensory and microbiological attributes of the treatments were investigated on storage.

MATERIALS AND METHODS

Fruits : Watermelons (*Citrullus lanatus*) Crimson sweet Var. were obtained from a farm located in Charlieville, Trinidad, WI. The fruits were rounded, light green in colour with stripes, with red flesh and small dark seeds. They were harvested at optimum ripeness with yields of 10-14kg. This variety can lose quality rapidly after optimum ripeness. Pulped mango (*Mangifera indica*) of the Common Local Var. was blended with watermelon juice. The mangoes were acquired from one tree (to minimise variability) in a farm located in San Juan, Trinidad, W.I.

Processing: Fig. 1 shows the generalised processing steps in the production of watermelon nectar. The fruits were washed, cut into halves and quarters using stainless steel knives. The juice was extracted using an Osterizer Commercial Blender (model #17441, Sunbeam Corporation, USA) and filtered through 0.5mm mesh to remove fibrous material. Sugar was then added to adjust the total soluble solids TSS (Table 1). The various watermelon nectar treatments (Table 1), were heated to 85°C, to which xanthum gum (Tastemakers Ltd. Port-of-Spain, Trinidad) was added in some treatments and ascorbic acid (1.0%) and then filled hot into presterilised 200ml glass bottles and capped. The bottles were water-pasteurised at 100°C for 20 min using a SafGard Pres Vac Home Pasteuriser (model #PM600F, USA, Schlvetter Co, USA).

Preliminary bench-top sensory

evaluation was done by 10 semi-trained panelists to screen the various watermelon treatments on acceptability (appearance, flavour and consistency). Panelists indicated that in watermelon treatments T1; T2; T3, the addition of 0.30% citric acid resulted in nectars which were too acidic. Also in T1 there was fermentation of the juice within 24 hrs of bottling, as judged by the presence of gaseous bubbles and the perception of mal-odour. In T2 there was separation of the juice into layers of a clear upper serum layer and a heavier layer, within 30 min of bottling. Also, panelist indicated that T1 and T3 were too viscous, with the inclusion of 0.25% xanthum gum.

In further experimental work, modifications were made to the preliminary treatments. On decreasing the percentage of citric acid from 0.30 to 0.10 (T4; T5), the acidic taste was not perceived; however on further increase to 0.15% (T6; T7), a slight acidity was detected which was not very acceptable. An addition of 0.20% citric acid to the watermelon treatments (T8; T9), resulted in acceptable taste. On reducing the percentage of xanthum gum from 0.25% in the preliminary treatments to 0.10% (T4:T6) resulted in separation of the suspension into layers within 16hrs of bottling. The addition of 0.20% xanthum gum to watermelon treatments (T5;T7;T9) resulted in the stability of the suspension up to at least 5 weeks of experimental storage at 20-25°C. Watermelon treatments which were blended with 15% or 25% addition of mango

pulp (T12;T13 resp) had the inclusion of a lower percentage (0.10%) of citric acid as the unprocessed mango juice was more acidic than the unprocessed watermelon juice (Table 2). Also potassium sorbate (0.10%) was added in some treatments (T11; T12; T13).

All the treatments were replicated with the production of 15 bottles per batch. The bottles were stored at 20-25°C and the final treatments (T10; T11; T12; T13) analysed on day1, wk1, wk2, wk3 and wk5 of processing.

Physicochemical Analyses : Colour of the unprocessed fruit juices and bottled nectars was measured on a Minolta Chroma Meter (model CR-200B, Minolta Camera Co. Ltd, Osaka, Japan). A 50ml sample was transferred to a 100ml colourless flask. The 8mm measuring port of the Minolta Chroma Meter was placed at three (3) points on the flask and the 'L', 'a', 'b' coordinates were recorded. The 'L' value represented the degree of lightness of colours, +/- (a) represented the degree of redness of greenness and +/- (b) the degree of yellowness or blueness.

The total soluble solids (TSS) of the unprocessed juices and products was measured on a hand-held refractometer (Leica Model #249 25-000, Atago E Type Series, Leica Inc., Buffalo, N.Y.). An average of three (3) readings for each of the final treatments in °Brix was recorded.

Total titratable acidity (TTA) expressed as % citric acid was

measured by titrating 20ml aliquot of sample with 0.1N NaOH using phenolphthalein as an indicator (#22.058, AOAC, 1990).

The pH was measured on 25ml of sample using an Orion pH meter (model EA 920, Orion Research Inc., Boston, USA) in triplicates.

Ascorbic acid was determined by the 2,6-dichlorophenol-indophenol visual titration method (Ranganna, 1984). An average of three (3) determinations from duplicate bottles was taken.

Consistency (Apparent viscosity) of the unprocessed watermelon juice of the products was determined using a Bostwick consistometer (model #24925-000, Genco Brand, USA). The gate was released and the average time (sec), 3 readings per duplicate bottles, which allowed the flow of 100ml of the sample over 24 units on the scale was recorded.

Microbiological Analysis: The number of aerobic microorganisms present in the samples was determined by standard plate count (SPC) using Plate Count Agar (PCA, Oxoid Hampshire, Ltd) and the plates incubated at 32°C for 48 hrs. Yeasts and moulds were enumerated on potato dextrose agar plates (PDA, Oxoid Hampshire Ltd., UK) acidified with 10% tartaric acid to pH 3.7 and incubated at 25°C for 3 days as outlined by Speck (1976). Colonies between 30-300 colonies per plate were counted and reported as CFU/ml of watermelon juice.

Sensory Evaluation : The

watermelon treatment samples (coded) chilled at 8°C for 1hr and shaken prior to serving were given to trained panelists and were asked to rank the watermelon juices, T10; T11; T12; T13 without ties on appearance, colour, odour and mouthfeel (#1 'least acceptable'; #4 'most acceptable') with comments. Also an overall rank for preference was obtained.

Statistical Analysis: The ranked data of the sensory analyses were subjected to Friedman's test as outlined by Lawless and Heyman, (1998). Statistical analysis of variance (ANOVA) determined the effect of treatment formulation and storage ($P < 0.05$) on the physicochemical attributes with a SAS Statistical Software (SAS Institute, Inc, 1989). The sample differences were separated using a multiple comparison test of Duncan's Multiple Range Test ($P < 0.05$).

RESULTS AND DISCUSSION

Physicochemical Attributes: Tables 2 and 3 show the physicochemical parameters of unprocessed juice and pasteurised nectars respectively. The fresh watermelon juice was less bright (higher 'L' value), more red (higher 'a' value) and less yellow (lower 'b' value), when compared to the unprocessed mango pulp (Table 2). There were significant variations ($P < 0.05$) in colour for the various watermelon treatments. Watermelon/mango blends of (T12; T13) appeared orange in colour having recorded higher 'L', 'a' and 'b' values when compared to watermelon treatments, T10 and T11. The 'b'

value was higher in T13, thus reflecting the higher percentage of mango juice in the treatment (25%) in comparison to T12 (15%). On storage, in all treatments there were minor variations in colour, with slight fading of the colour. The colour values indicated that the treatments became darker, less red and less yellow. Lycopene and carotene have been isolated from watermelons, with lycopene being responsible for red colour (Pratt, 1971). Gowda and Jalali (1995) reported decreases in lycopene and carotenoid contents in watermelon juice on storage for six months at room temperature.

The unprocessed mango juice had a lower pH (4.22 ± 0.10) compared to the unprocessed watermelon juice (5.04 ± 0.03); thus in watermelon/mango blend treatments (T12 : T13), a lower percentage citric acid was added (0.10) in processing as compared to 0.20% citric acid to watermelon treatments (T10; T11). On storage the pH values 3.70-3.99 dropped to 3.65-3.68. On processing, citric acid was lost, compared to the data in Table 2 for unprocessed juices with the percentage of citric acid content of the nectars (Table 3). At the end of 5 weeks storage, there were further losses of citric acid (2.3-8.5%) in the treatments)

There was loss of ascorbic acid (%) on processing of watermelon nectars (59.08-62.82%). There was no significant difference ($P < 0.05$) in the ascorbic acid content of all pasteurised watermelon products. Table 4, shows that ascorbic acid was lost on storage as shown by the

percentages of retention of ascorbic acid. Ascorbic acid is easily destroyed by oxidation, especially at high temperatures and it is the vitamin most easily lost during food processing and storage (Potter and Hotchkiss, 1995). Saini and Bains (1994), reported that more than 10% of ascorbic acid was lost in watermelon juice during processing, which increased to 28-35% after 26 weeks of storage.

There were significant differences ($P<0.05$) in consistency of watermelon treatments. Table 3 indicates that watermelon/mango blended nectars (T12; T13) were more viscous than watermelon nectars (T10; T11). There were no changes in total soluble solids (oBrix), of the watermelon juice treatments on storage. The time of flow over 24 units were ; T10-0.52; T11-0.74; T12-31.73 and T13-95.01. The inclusion of mango pulp in watermelon/mango blended nectars T12 and T13, which had a lower addition of xanthum gum (0.10%) resulted in greater consistency as compared to treatments containing watermelon juice (0.20% xanthum gum, Table 3). There were no significant differences ($P>0.05$) in consistency of the various treatments on storage. Gowda and Jalali (1995), in their study on juice making from watermelon fruits, reported no significant change in apparent viscosity on storage for 6 months.

Microbiological Analysis: The unprocessed watermelon juice had more than 100 CFU/ml and the unprocessed mango juice had less than 100 CFU/ml. Unpasteurised

watermelon (control) juices resulted in fermentation within 24 hrs of bottling. Microbial analyses of the treatments by wk 5 of storage showed minimal presence of microorganisms of 10-100 CFU/ml, thus indicating that the low pH, addition of potassium sorbate and heat processing were effective in preservation.

Sensory Evaluation : The sensory overall ranks of the different watermelon nectars are presented in Table 5. There were significant differences ($P<0.05$) in overall sensory ranks, colour and appearance in the watermelon treatments. The blends with watermelon and mango pulp (T12; T13) were given the lowest overall ranks and thus were the least preferred which may be linked to the significant differences ($P<0.05$) in sensory colour and appearance scores (Table 6) and to the 'L' 'a' 'b' values of these treatments (Table 3). There was no significant difference ($P>0.05$) in sensory taste. In describing the taste of fruits juices, the Brix-to-acid ratio is commonly used (Potter and Hotchkiss, 1995); hence for the products, the ratios were from 20-25 oBrix to 3.75-3.99 (Table 3). Gowda and Jalali (1994), indicated that there was a need to adjust the total soluble solids (TSS) to acidity and improve the ranked acceptability of the watermelon drinks, which was shown in this research.

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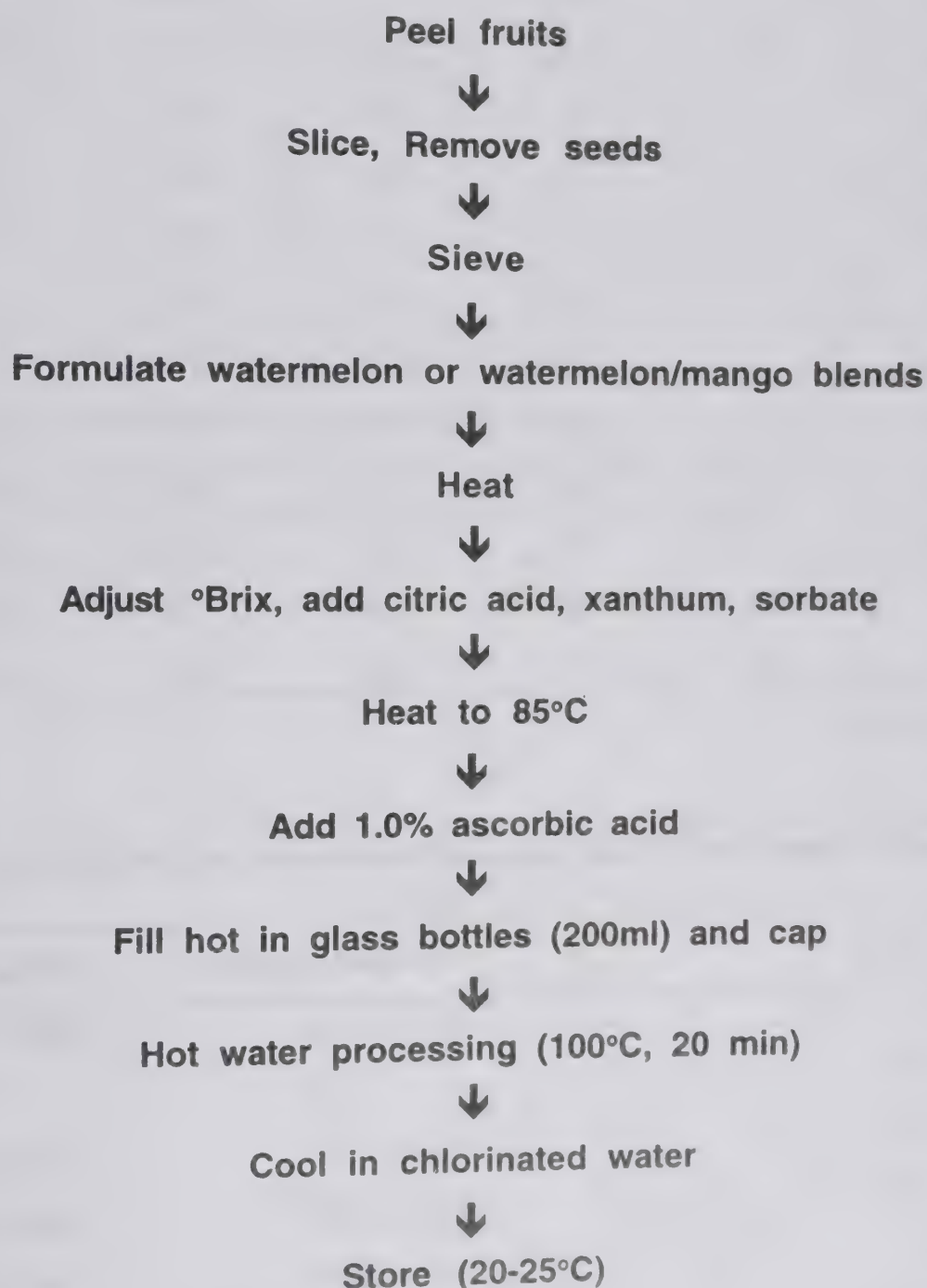


Fig 1 Processing Scheme for Watermelon Nectars

Table 1 Watermelon Nectar Treatments

T.Nos	Water melon(%)	Mango (%)	TSS (°Brix)	Xanthum Gum(%)	Citric Acid(%)	Sorbate (%)
T1	100	-	15	0.25	0.30	-
T2	100	-	15	-	0.30	-
T3	100	-	15	0.25	0.30	-
T4	100	-	15	0.10	0.10	-
T5	100	-	15	0.20	0.10	-
T6	100	-	15	0.10	0.15	-
T7	100	-	15	0.20	0.15	-
T8	100	-	15	0.10	0.20	-
T9	100	-	15	0.20	0.20	-
T10	100	-	25	0.20	0.15	0.10
T11	100	-	20	0.20	0.15	0.10
T12	85	15	20	0.20	0.10	0.10
T13	75	25	20	0.20	0.10	0.10

Only T 1 was not pasteurised

Table 2 Physicochemical Parameters of Unprocessed Watermelon and Mango Juice

Parameters	Watermelon Juice	Mango Pulp
Colour	32.6, 4.4, 2.1	53.2, 2.5, 36.2
L, a, b,		
TSS, °Brix	5.5±0.10	16.0±1.0
pH	5.04±0.003	4.22±0.010
Citric acid, mg/100ml	0.17±0.01	0.44±0.04
Ascorbic acid, mg/200ml	1.39±0.08	7.02±0.05
Consistency, time (sec) to flow 24 units	3.0	>120 sec

Means±SE

Table 3 Physicochemical Parameters of Pasteurised Watermelon Nectars

Parameters	T 10	T 11	T 12	T 13
Colour L a b	30.5, 4.4, 3.7	29.0, 4.3, 5.4	32.3, 6.2, 7.5	32.9, 6.1, 11.2
pH	3.75	3.87	3.97	3.99
Citric acid, mg/200ml	0.052	0.049	0.049	0.056
Ascorbic mg/200ml	81.84	74.36	75.36	81.84
TSS, oBrix	25	20	20	20
Consistency, time (sec)	1.0	0.43	18.6	110

T 10 : 100% watermelon, 25°Brix, 0.15% citric acid, 0.20% xanthum

T 11 : 100% watermelon, 20°Brix, 0.15% citric acid, 0.20% xanthum

T12 : 85% watermelon, 15% mango, 20°Brix, 0.10% citric acid, 0.20% xanthum

T 13 : 75% watermelon, 25% mango, 20°Brix, 0.10% citric acid, 0.205 xanthum

Analyses performed 1 day after processing

Table 4 Ascorbic Acid Retention % of Fortified Watermelon Nectars on Storage

T.No.	% Retention of Ascorbic Acid				
	Initial Ascorbic mg/200ml	Week 1	Week 2	Week3	Week5
T 10	0.82	100	89.2	86.6	85.5
T 11	0.82	100	100	98.6	95.5
T 12	0.75	98.2	95.5	93.4	89.4
T 13	0.82	100	100	93.0	91.3

T 10 : 100% watermelon, 25°Brix, 0.15% citric acid, 0.20% xanthum

T 11 : 100% watermelon, 20°Brix, 0.15% citric acid, 0.20% xanthum

T12 : 85% watermelon, 15% mango, 20°Brix, 0.10% citric acid, 0.20% xanthum

T 13 : 75% watermelon, 25% mango, 20°Brix, 0.10% citric acid, 0.20% xanthum

Table 5 Overall Sensory Ranks for Watermelon on Storage

T.No.	Week 1	Week 2	Week3	Week5
T 10	3.7a	3.6a	3.9a	3.0b
T 11	3.5a	3.6a	3.5a	3.7a
T 12	2.0b	2.1b	2.2b	2.3c
T 13	1.5c	2.0b	1.1c	1.7d

Mean ranks with same letters in columns were not significantly different ($P>0.05$)

T 10 : 100% watermelon, 25°Brix, 0.15% citric acid, 0.20% xanthum

T 11 : 100% watermelon, 20°Brix, 0.15% citric acid, 0.20% xanthum

T12 : 85% watermelon, 15% mango, 20°Brix, 0.10% citric acid, 0.20% xanthum

T 13 : 75% watermelon, 25% mango, 20°Brix, 0.10% citric acid, 0.20% xanthum

Table 6 Appearance(A) and Colour (C) Sensory Ranks for Watermelon Treatments on Storage

T.No.	Week 1		Week 2		Week3		Week5	
	A	C	A	C	A	C	A	C
T 10	3.6a	3.1a	3.6a	3.7b	2.9a	3.2a	4.0a	3.9a
T 11	2.9a	2.6a	3.4a	3.0b	3.3a	3.5a	3.1b	3.3b
T 12	2.2c	2.3b	2.1b	2.2c	2.0b	1.6b	2.0c	2.5b
T 13	1.7b	1.5c	1.3c	1.6d	1.3c	1.2b	1.1d	1.0d

Mean ranks (#1 least preferred; #4 most preferred) followed by same letteres were not significantly different ($P>0.05$)

T 10 : 100% watermelon, 25°Brix, 0.15% citric acid, 0.20% xanthum gum

T 11 : 100% watermelon, 20°Brix, 0.15% citric acid, 0.20% xanthum

T12 : 85% watermelon, 15% mango, 0.20°Brix, 0.10% citric acid, 0.20% xanthum

T 13 : 75% watermelon, 25% mango, 0.20°Brix, 0.10% citric acid, 0.20% xanthum

STUDIES ON FLAVOUR AND SENSORY QUALITY OF INSTANT KABULI CHANNA MIX

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ABSTRACT

Changes in flavour profile and sensory quality of instant *kabuli channa* mix packed in paper-aluminium foil-polyethylene laminate (PEP) were monitored during storage in order to assess the shelf life of product. After 9 months of storage, the losses in flavouring compounds ranged from 8.0 to 74.2% and 10.5 to 80.6 at RT and 37°C respectively. Instant *kabuli channa* mix remained stable upto 9 months. The changes in flavour and sensory score could not be correlated.

INTRODUCTION

Kabuli channa curry is a highly popular and delicious dish and consumed all over India. Traditional method of preparation of *kabuli channa* curry is quite lengthy and cumbersome. It requires presoaking for 8-10 hr and pressure cooking for 25-30 minutes. Therefore a process for making instant *kabuli channa* mix was developed by Patki et al (1998), wherein it was based on presoaking, pressure cooking, conditioning, freezing and drying of *kabuli channa* under controlled conditions and blending with spices and seasoning. The instant *kabuli channa* mix reconstituted easily by boiling in water within 5 minutes. Changes in the flavour of foods during storage are the most serious limitation of shelf life of the product, which in turn affects consumer acceptance. The changes in flavour may emanate from a number of factors such as interaction of packaging materials, absorption of malodorous compounds from the storage environment, nonenzymic

browning reactions, storage temperature and time (Vidyasagar et al 1991). As the instant *kabuli channa* mix is a highly spicy product, changes in the flavouring constituent of spices play a major role in the sensory quality of the product. Therefore, in the present paper, changes in the major flavouring constituents of spices of instant *kabuli channa* mix were monitored during storage and correlated to the sensory scores in order to estimate the shelf-life.

MATERIALS AND METHODS

Preparation of Instant *Kabuli Channa* : Instant *kabuli channa* was processed by soaking (6-7 hr), pressure cooking (20 psi, 15 min) by freeze thaw dehydration method of Patki et al (1998).

Preparation of Spice Mix: Spice mix was prepared by mixing cumin powder (25.7 g), clove powder (12.8 g), cardamom powder (12.8 g), cinamon powder (25.7 g), black pepper powder (12.8 g), mace powder (12.8 g), coriander powder

(79.2 g), fenugreek powder (6.4 g), red chilli powder (25.7 g), ginger powder (44.6 g), onion powder (446.4 g), garlic powder (44.6 g), turmeric powder (45.0 g), salt (201.0 g) and citric acid (4.5 g).

Blending : *Vanaspati* (150 g) was heated in a stainless steel vessel to 120°C and spice mix (350 g) was added to hot *vanaspati* with continuous mixing. The vessel was removed from the flame and processed *kabuli channa* (600 g) was added in the hot spice mix and stirred continuously to ensure uniform coating of the spices to *kabuli channa*.

Packaging and Storage : Instant *kabuli channa* mix (100 g) was packed in paper (42 GSM)-aluminium (0.02 mm)-polyethylene (75 μ) pouches and stored at room temperature (15-34°C, 47-78 % RH) and 37°C for evaluating storage stability.

Reconstitution : Instant *kabuli channa* mix (100g) was

reconstituted in 400 ml boiling water and stirred continuously for 5 min.

Extraction of Flavour : Flavour from instant *kabuli channa* mix (50 g) was extracted by simultaneous distillation method using diethyl ether (50 ml) as a solvent. Extract was concentrated by gently blowing nitrogen gas over the surface of extract and volume was made to 200 μ l.

Capillary Gas Chromatography (GC) :- Capillary GC analysis was carried out on a Chemito 8510 HR gas chromatograph equipped with flame ionisation detector (FID) and connected to a chemito 5000 integrator. Separation was achieved on a 30 m x 0.25 mm id DB-5 column. The oven temperature was programmed from 50°C to 210°C at 3°C/min (10-min hold). The injector and detector temperature was 210°C & 240°C respectively. The hydrogen carrier gas flow rate was 1.05 ml/min with an injector splitter at a split ratio of 30:1. Sample injection volume was 1 μ l.

Capillary Gas Chromatography-Mass Spectrometry (GC-MS): Electron impact mass spectrometric data were collected on a Finnigum GC-MS. The column and GC condition were same as described for GC analysis except that helium gas was used as carrier at a flow rate of 30 cm/sec. The mass spectrophotometry was operated at an ionisation voltage of 70 eV, ion source temperature 200°C and transfer line temperature 250°C. Sample components were verified by comparison of the mass spectra data matching with NIST library

and with retention time of authentic standards.

Sensory Evaluation : Initially and after regular intervals, the instant *kabuli channa* mix were reconstituted and given to a panel of fifteen trained judges for quality evaluation with respect to colour, texture, flavour and overall acceptability on a 9 point hedonic scale, with 9 for "excellent in all respects" while 1 for "highly disliked" samples.

RESULTS AND DISCUSSION

Instant *kabuli channa* mix had $5.20 \pm 0.10\%$ moisture, $22.90 \pm 0.35\%$ fat, $15.45 \pm 0.25\%$ protein, $1.50 \pm 0.04\%$ total ash and 14.25 ± 0.10 μ g/g total carotenoids. The volatile aroma concentrate obtained by the SDE procedure closely resembled the aroma of fresh *kabuli channa* curry. The result of GC-MS analysis of volatile flavour components of spices present in mix is given in Table-1. Twenty-two main spice flavouring compounds were identified in instant *kabuli channa* mix and their relative concentration were monitored during storage at room temperature (RT) and 37°C. Freshly processed instant *kabuli channa* mix contained mainly 27.57% eugenol, 6.23% cuminaldehyde, 5.79% β -pinene, 5.07% cinnamaldehyde, 4.6% x-pinene, 3.20% p-cymene, 2.84% linalool, 2.56% eugenol acetate and 1.37% boroneol while methyl propyldisulphide, sabinene, myrcene, 3-carene, x terpinene, limonene, ocimene, citranellal, terpene-4 ol, geraneol and carryophylene were present less than

1% in *kabuli channa* mix.

The losses in flavouring compounds were more pronounced at 37°C than room temperature. After 9 months of storage the losses in flavouring compounds ranged between 8.0-74.2 and 10.5-80.6% in *kabuli channa* mix stored in PFP pouches at RT and 37°C respectively. After 9 months of storage at 37°C, only 61.8% methylpropyldisulphide, 81.6% x-pinene, 30.0% sabinene, 60.4% β -pinene, 47.4% myrcene, 33.3% 3 carene, 56.7% x-terpinene, 75.0% p-cymene, 36.8% limonene, 63.0% cineol, 26.3% ocimene, 79.2% linalool, 19.4% citronellal, 76.9% terpene-4-ol, 75.9% boroneol, 83.5% cuminaldehyde, 56.8% geraniol, 49.0% β -carryophylene, 33.3% cinamaldehyde, 89.5% x-terpenyl acetate, 67.2% eugenol and 68.0% eugenol acetate were retained but changes in flavours could not be correlated with sensory score.

Changes in colour taste, flavour and overall acceptability of reconstituted instant *kabuli channa* mix at RT and 37°C are given in Table 2. Initially the *kabuli channa* mix had an overall acceptability score of 8.3 on 9 point hedonic scale and therefore a score of 7.0 was taken as a limit of shelf life in storage experiment. The changes in sensory score were least at RT than 37°C. After 9 months of storage, the changes in OAA score of *kabuli channa* mix ranged between 8.3-7.0 on a 9 point hedonic scale at RT and 37°C respectively.

The above study revealed that

instant *kabuli channa* mix remains stable and acceptable upto 9 months both at RT and 37°C. As expected the losses in flavouring constituents and changes in overall acceptability score of instant *kabuli channa* mix were more pronounced at 37°C than room temperature.

ACKNOWLEDGEMENT

The authors are thankful to the Project Coordinator, Cereal & Pulses Technology Division for providing necessary facilities.

REFERENCES

1. Patki PE, Srihari P and Arya SS (1998). Studies on development of instant whole legumes, Defence Science Journal, 1998 (accepted).
2. Vidyasagar K, Premavalli KS and Arya SS (1991). Effects of oils and packaging materials on the storage stability of instant cereal mix, *Ind. Food Packer*, 45, 24-32.

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WORKS

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District : Sonapat - 131028 (Haryana)
Phone : 011-911-70379

Table 1. Changes in the flavour constituents of instant spiced *kabuli channa* mix stored in paper (42 GSM)- aluminium foil (0.02 mm) -polyethylene (37.5 μ) at room temperature (15-35°C) and 37°C

Constituents	Relative concentration					
	RT			37°C		
	Initial concn.	2m	6m	9m	2m	6m 9m
Methyl propyldisulphide	0.55	0.46	0.40	0.40	0.44	0.38 0.34
x-Pinene	5.07	4.91	4.70	4.44	4.58	4.42 4.14
Sabinene	0.10	0.09	0.07	0.04	0.08	0.05 0.03
β -Pinene	6.13	4.20	4.20	3.83	4.03	4.07 3.70
Myrcene	0.19	0.18	0.15	0.12	0.16	0.13 0.09
3-Carene	0.21	0.18	0.13	0.10	0.15	0.10 0.07
x-terpinene	0.67	0.60	0.48	0.47	0.52	0.44 0.38
Cymene	3.20	2.67	2.65	2.53	2.65	2.59 2.40
Limonene	0.19	0.19	0.14	0.09	0.16	0.10 0.07
1,8 Cineol	4.60	4.58	3.56	3.38	4.14	3.24 2.90
Ocimene	0.19	0.14	0.10	0.08	0.11	0.08 0.05
Linalool	2.84	2.82	2.75	2.41	2.73	2.58 2.25
Citronellal	0.31	0.25	0.15	0.08	0.20	0.11 0.06
Terpene-4-ol	0.26	0.23	0.22	0.21	0.22	0.22 0.20
Boroneol	1.37	1.36	1.30	1.07	1.29	1.21 1.04
Cuminaldehyde	6.23	6.06	5.71	5.37	5.93	5.69 5.20
Geraneol	0.44	0.33	0.32	0.25	0.32	0.30 0.25
b-carryophylene	0.51	0.44	0.38	0.30	0.40	0.32 0.25
Cinamaldehyde	5.79	5.43	3.28	2.96	4.35	2.34 1.93
x-terpenylacetate	5.92	5.63	5.66	5.45	5.32	5.43 5.30
Eugenol	27.57	25.89	22.5	19.4	23.8	21.35 18.52
Eugenol acetate	2.56	2.54	2.22	1.98	2.24	2.02 1.74

Mean of three determinations; maximum variation did not exceed 2% of the mean.

Table 2. Changes in colour, aroma, taste and overall acceptability of instant *kabuli channa* mix packed in PFP packs at RT and 37°C

Storage period (months)	Storage temperature (°C)	Colour	Aroma	Taste	Overall acceptability
0	-	8.4±0.2	8.3±0.2	8.2±0.1	8.3±0.3
2	RT	7.8±0.2	7.6±0.1	7.6±0.2	7.6±0.2
	37	7.5±0.1	7.4±0.2	7.6±0.3	7.4±0.1
6	RT	7.3±0.3	7.5±0.4	7.4±0.1	7.4±0.3
	37	7.4±0.1	7.2±0.2	7.2±0.1	7.2±0.2
9	RT	7.3±0.2	7.5±0.3	7.5±0.3	7.4±0.1
	37	7.2±0.2	7.1±0.1	7.0±0.1	7.0±0.1
Mean of fifteen value ± SD.					

SPECIAL ARTICLES

EXPORT COMPETITIVENESS OF INDIAN FLORICULTURE AND NEED OF POLICY ENVIRONMENT

D.Rajagopalan, Chairman
*Agricultural & Processed Food Products Export
Development Authority (APEDA)*

STRUCTURE OF PRESENTATION

- World Trade
- Floriculture India Present Status
- Floriculture India - Creating Opportunities.

FLORICULTURE - OVERVIEW

- Cut Flower Industry in India is Nascent
Cut Flower Trade Globally - US\$7 Billion
(Rs.30,000 Cr)
- *Consumption Centres* - Europe, Japan, Australia, Singapore and North America.
- Trend - Outsourcing Due to High Cost of Production (COP) from Tropical Countries with Lower COP
- *India* - Favourable Agroclimates, Cheap Labour and Arable Land, Help Indian Potential for Cut Flower Exports.
- *The Vision* - Make Indian Floriculture Globally competitive.
- Thrust area status by Govt of India for Floriculture Industry as a potential Foreign Exchange earner.

FLORICULTURE

WORLD TRADE

WORLD TRADE - FLORICULTURE

- MAIN CONSUMING REGIONS

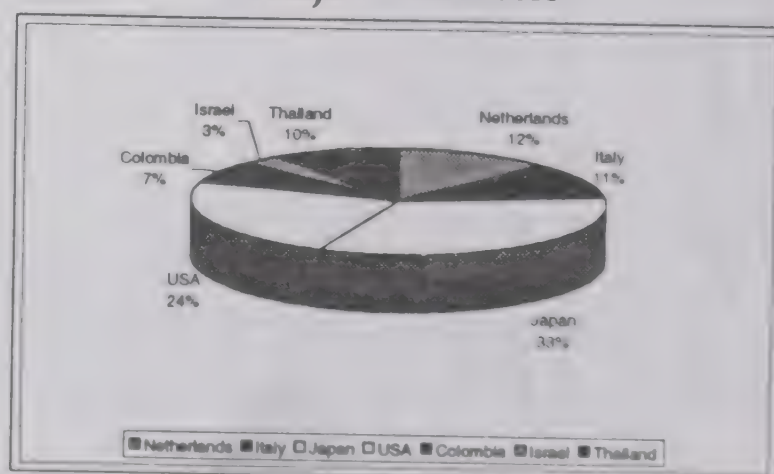
- Europe
- Japan
- Australia
- Singapore
- North America

- MARKET SEGMENTS

- Gifts 50%
- Own Use 20-30%
- Use in Cemeteries 10%
- Industrial Use 10-15%

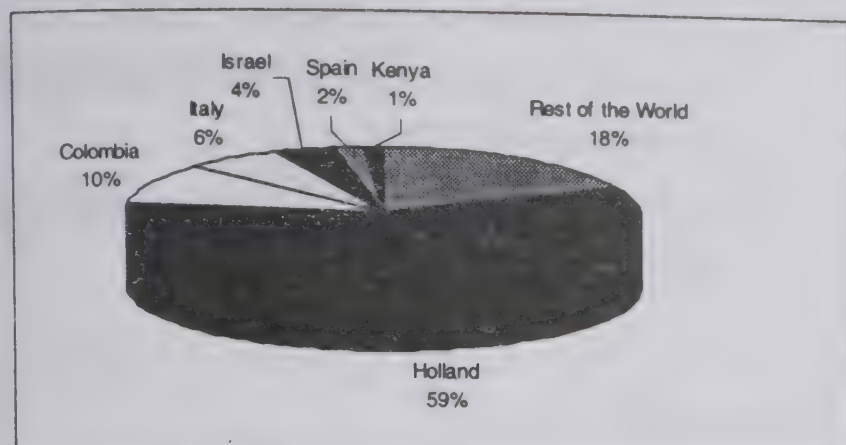
WORLD TRADE - FLORICULTURE

Major Producers



WORLD TRADE - FLORICULTURE

Leading Players in Flower Trade



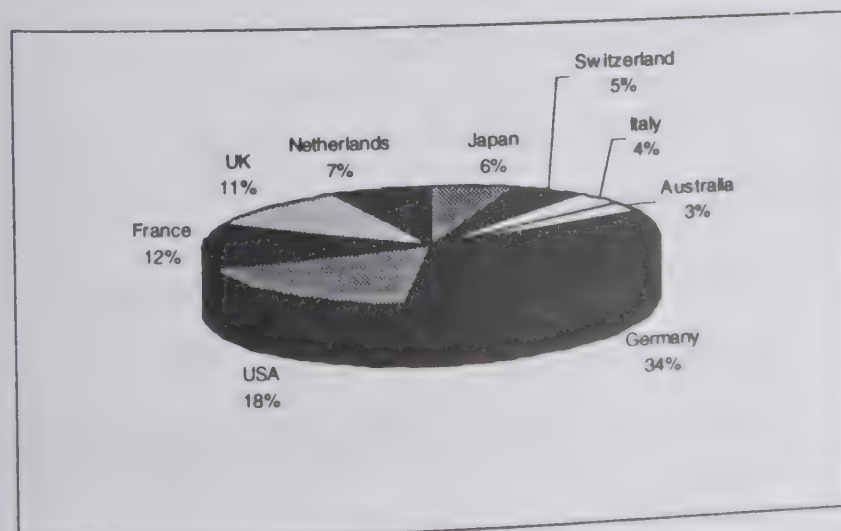
WORLD TRADE - FLORICULTURE

MAJOR EXPORTERS

- Share of 4 leading exporters About 80% (Holland, Colombia, Italy & Israel)
- Share of Developing Countries >20%
- Global Cut Flower Growth Rate about 11%

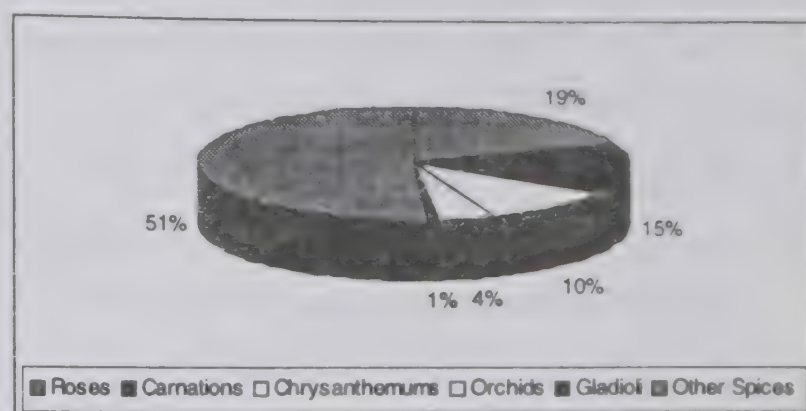
WORLD TRADE-FLORICULTURE

Major Flower Importing Countries



WORLD TRADE-FLORICULTURE

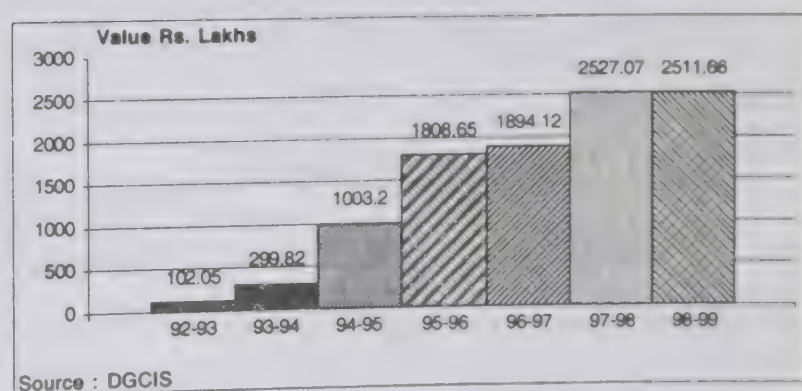
Share of Major Species in Total Imports to EU



FLORICULTURE

EXPORTS FROM INDIA

INDIA'S FLORICULTURE EXPORTS



FLORICULTURE INDIA

Advantages

- Locational advantage - India at centre of Flower world.
- Availability of suitable land in abundance
- Conducive climate Range of Micro Climates Across the Sub Continent.
- Manpower and labour availability.

FLORICULTURE INDIA

Support & Understanding

- African, South American and Israel had a head start over India and took more than a decade to establish themselves.
- Floriculture in India is hardly six years old.
- Nature of this business requires a continuous positive understanding and support from all concerned, in the initial decade of existence.

Present Status of Existing Units

Particulars	North	West	South	Total
100% EOU	13(-4)=9	11(-2)=9	36(-4)=32	60(-10)=50
NON EOU	--	14(-4)=10	12(-1)=11	26(-05)=21
TOTAL	13(-4)=9	25(-6)=19	48(-5)=43	82(-11)=71
				86-15=71

100% EOU Floriculture units approved by the government during 01/08/91

Handicaps

HIGH COST OF CAPITAL

- Cost of Capital - 18% p.a. on an average
- Infrastructure & Logistics
 - Cold chain
 - electricity
 - roads
 - cargo space

Production

- Poor Productivity - 62% of Projections
 - Actual Production - 118 stems per sq. mt.
 - Projected Production - 190 stems per sq.mt.

• Cause:

- Inappropriate Choice of Plant Varieties & Technology
- low adoption of Agronomy Skills
- lack of critical chemical / fertilizers inputs at appropriate time.
- lack of adequate and timely financial support

Production

Revised norms are as under :

Total Project Cost	Rs. 160-200 lakhs per hectare.
Minimum size of project	3 hectares
Yield parameter	130 stems/ sq. mtrs.

Earlier the project cost was Rs. 200-300 lakhs per hectare

The Current Situation

Steep learning curve negotiated

- Low cost indigenous inputs
- Large pool of skilled manpower
- Direct marketing
- Production technology

The Current Status

MAJOR PRODUCTS :

Fresh Cut Flowers

Tropical Orchids

Dendrobium Mokaras, Arandas, Ranantheras, Vandas

Seasons

South India - Year round

Existing Markets

Europe, Japan, Australia, Singapore, North America, Russia.

MAJOR PRODUCTS :**Fresh cut flowers**

Sub-Tropical Orchids - *Oncidium* has potential for exports.

Temperate Orchids - *Cymbidiums* (cut flowers), *Papilpepidiums* (cut flowers), *Vandas* (Cut flowers), *Cattleyas* (pot plants), *Phelanopsis* (pot plants & cut flowers)

Seasons

North East India - Year round

Existing Markets

Europe, Japan, Australia, Singapore, North America, Russia.

Fresh Cut Flowers**ROSES**

Cora, Corvetti, Diplomat, Escade, Femma, First Red, Grand Gala, Kiss, Konfetti, Lambada, Laser, Movie Star, Nicole, Noblesse, Osiana, Papillon, Pareo, Pavrotte, Rodeo, Rossini, Sacha, Samurai, Sandy Femma, Sangria, Skyline, Stralight, Texas, Tineke, Vivaldi, Soledo, Susanne.

Seasons

North India - October to May

South India - Year round

West India - Year round

Existing Markets :

U.K. Holland, Japan, Australia, Singapore.

ANTHURIUM

Varities : (Potential for Exports)

Midore, Tropical, Arizona, Rapido, Pierrot, Pistaches, Sultan, President, Amigo.

Seasons

North India - Year round

South India - Year round

West India - Year round

Existing Markets

U.K. Holland, Japan, Australia, Singapore

ASIATIC LILIES - Nova Sento, Elite, Brato, Granparadiso, Cordile Dreamland.

ORIENTAL LILIES - Montana, Peasro, Stargazer, Sierra, Nevada, Lollypop

Lilium Longiflorums - Seasons

North India - July to April

South India - year round

Existing Markets

Europe, Japan, Australia, Singapore, UAE, Italy & USA.

GLADIOLI**Varieties**

Eurovision, Spic & Span, Rose, Supreme, White prosperity, Traderhorn, Cencera, Gold field, Read Beauty, White fox lillium.

Seasons

North India - June to April

South India - year round

West India - October to April

Existing Markets

U.K. Holland Japan Australia, Singapore.

CARNATIONS**Varieties**

Dona, Pink Dona, Malaga, White Dona, Cobra, New Tempo, Salmanka, Yellow liberty, White liberty.

Seasons

North India - November to April

South India - October to April

West India - November to April

Existing Markets

U.K. Holland, Japan, Australia, Singapore, Middle East.

GERBERA

Varieties : (Potential for Exports)

Sangria, Cabana, Goliath, Tiramisu, Amarou, Dalma, Ellimay, Crossfire, Ventury, Thalasa, Mistique, Pink, Elegance

Seasons

North India :

South India : year round

West India : year round

Existing Markets

U.K., Holland, Japan, Australia, Singapore

OTHER PRODUCTS

Varieties :

Potted Plants, Tissue Culture Plants, Flower Bulbs, Flower Seeds, Flower & Vegetable Seeds, Dried Flower & Other Plant Parts.

MAJOR LOCATIONS OF CUT FLOWERS

Production :

BANGALORE

PUNE

DELHI

HYDERABAD

Carnations, Gerberas, Chrysanthemum, Anuthium, Gladioli etc. are all good flowers and highly priced in the international market. Can compete in the international market with regard to the quality and production year round.

APEDA - CREATING OPPORTUNITIES

APEDA'S INITIATIVES

APEDA - CREATING OPPORTUNITIES

India's First & Only Flower Auction Centre

- Flower Auction Centre, KAIC, Bangalore
- Started on October 15, 1995

Proposal for Remodelling, Automating & Internet. Enabling of existing Flower Auction Centre at KAIC, Bangalore is under consideration of the Government.

- Chennai - Proposal under consideration.
- Delhi - Land identified but yet to be allotted
- Bombay - Land to be allotted.

APEDA - CREATING OPPORTUNITIES

- Setting up of common marketing centres in Europe
- Financial Rehabilitation Package for Floriculture Units is under active consideration of Government IDBI has been nominated as a Co-ordinating agency for Institutions/Banks. The recommendations of these institutions will be sent to the government for considering rehabilitation of sick units.
- To provide infrastructure facility for production of variety specific planting material indigenously such as tissue culture laboratory, tissue culture haring facilities, must propagation chambers, heated benches, cold store facilities, soil pasteurisation facilities.

APEDA - CREATING OPPORTUNITIES

Floriculture Infrastructure Park

SALIENT FEATURES

- Best Sale Realisations
- Direct Marketing
- Best quality
- Availability of all inputs
- Efficient Cold Storage
- Common Grading & Packing
- Integrated Pest & Disease Management
- Free online Technical Consultancy
- Lower Production Costs
- Lowest per Hectare Project Cost

APEDA - Creating Opportunites

Advantages for Units in FIP

- Low project cost
- Advantages of scale
- Technical support

- Operational support
- Logistics support
- Marketing support

Services for Units outside FIP

- Marketing
- Efforts are being made to promote similar Parks in the State of Uttar Pradesh Himachal Pradesh & Karnataka

APEDA - Creating Opportunites

Policy Initiatives

- To promote the concept of Tanflora Infrastructure Park in other States.
- To make efforts to rehabilitate the sick units
- To create marketing facilites abroad
- To create storage facilities of the floriculture products in Europe
- To develop Auction Centres in the States of Karnataka, Delhi, Maharashtra & Tamil Nadu.
- To provide financial nurturing for revival and rehabilitation of ailing units.

NEW PRODUCT

Environment friendly spice packaging

The central requirements of spice packaging are good aroma retention and UV and moisture protection. The world's biggest spice refiner, McCorminck & Company Inc. has adopted a new board packaging for its range of products on the Finnish market, with plans to extend its use to Asia. With the new packaging, McCormick spices are now guaranteed to have a shelf life of three years, with no compromise in aroma quality. Product information is now printed directly on the package, dispensing with adhesive labels. The choice of aluminium free Performa CTMP board, from packaging company Stora Enso, is in line with the company's environment friendly values. Performa CTMP board embodies the patented Ensobarr High Barrier coating, which is gas-proof, aroma-proof and greaseproof, with sufficient light protection.



Precision weighing with new belt weigher from Denmark

Scaenvegt, the Danish manufacturer of industrial scales, production management system and automatic weighing machines has launched the new Dynamic Belt Weigher ScanFlow 4674. Standard features include pick-up/yield control on breaching lines, glazers, brine injectors, de-boners and cookers, and online weighing of raw materials like potatoes and fruit.

The stainless steel ScanFlow 4674 is fitted with rails for weighing a continuous line of potatoes and other vegetables with a high throughput of up to 150 tons per hour. The software automatically updates and calculates the accumulated flow of vegetables up to 500 times a second with extreme accuracy and reduced product damage, as the production is online without buffering. The accurate weight figures can provide the basis for payment to suppliers.

By incorporating the load transfer principle, accurate transfer of the load on the weighing machine to the load cells is made, irrespective of its position on the load unit - impossible to achieve with any single point transfer system.



More flexibility with mid-range roll-fed labeller

B&H Labelling Systems introduces the Model 2600 roll-fed labeller, a mid-range performance machine for an extensive range of container sizes and label applications.

Handling containers from 5.08-12.7 cm in diameter, the BH2600 labels beverage containers with volumes from 0.17 to 3 litres and a broad range of food containers at speeds up to 500 cpm. It is equipped with a large vacuum drum and tallr Theta Cutter that promotes production flexibility by accommodating longer and wider labels and reducing changeover procedures and time.

The Rapid Change Over feature is a no-required container size and label changeover that can be achieved by one person in 5-10 minutes. B&H's patented Advanced computerised Registration System (ACRS) insures that labels are cut to the correct length and placed in the precise spot.

Easier maintenance is made possible by in-built vacuum hoses, improved access to the vacuum drum and cutter, and a single gear belt drive instead of traditional chains that tend to stretch. Other features include a pneumatic tension system and air brakes, glue wheel assembly and a user-friendly touch screen control panel equipped with a

user-friendly touch screen control panel equipped with a moderate connection that facilitates off-site trouble shooting.



Evergreen launches mid-speed fillers for dairy and juice products

Evergreen Packaging Equipment recently launched its Model GTL-3000 and GTN-3000 packaging machines at Anuga Food Tech in Cologne, Germany. Operating at 6,000 gable top cartons an hour, these machines are engineered to fill the needs of dairy and juice packages needing moderate volumes of fresh refrigerated packaging using gable top cartons.

The GTL-3000 packs sizes from 250 ml to 1.151 standard cross-section cartons, while the smaller GTN-3000 handles 125ml to 0.51 small cross-section cartons suited for school feeding programs, vending and other single serve uses.

Both models include PCL controls, sanitary design and tight top and bottom seals. The GTL-300 can be equipped with an on-machine spout applicator for use with easy open/close pour spouts. Optional features like the HEPA filtered air enclosures and auto sanitise features apply for both models.



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PUBLICATIONS

AIFPA PUBLICATION

1. The Prevention of Food Adulteration Act, 1954
(37 of 1954)
AND
Prevention of Food Adulteration Rules, 1955 Rs. 100.00
2. Investment Opportunities in India for Food Processing Industries Rs. 100.00
3. The Standards of Weights and Measures Act, 1976 Rs. 100.00
4. The Standards of Weights and Measures (Packaged Commodities)
Rules 1977 Rs. 100.00
5. The Fruit Products Order (FPO) Rs. 100.00
6. AIFPA Members Directory Rs. 250.00
7. Indian Food Packer (Bimonthly Journal) Rs. 100.00 per Copy
Annual Subscription for Indian Food Packer Rs. 400.00 for Six issues.

D.D./Cheque should be sent in favour of ALL INDIA FOOD PRESERVERS' ASSOCIATION, NEW DELHI.

Note : Some important publications will be introduced shortly.

AIFPA LIBRARY

ALL INDIA FOOD PROCESSORS' ASSOCIATION library provides important information support in various activities of the association. The Library is being regularly strengthened by adding more important books, reports, news, journals and magazines etc. The collection is mainly on the subjects like, processed Food and Fruits & Vegetable in India and the Investment opportunities in India for Food Processing Industries.

If you need any information please visit our Library.



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INDIAN CONVENTION OF FOOD SCIENTISTS & TECHNOLOGISTS 2000

Focal Theme:
**MODERN TRENDS
& PERSPECTIVES IN
FOOD PACKAGING
FOR 21ST CENTURY**



22-24 NOV 2000 MYSORE INDIA

Organised by
Association of Food Scientists & Technologists (India)
& Central Food Technological Research Institute, Mysore

ICFOST-2000, the Indian Convention of Food Scientists and Technologists will be held during November 22-24, 2000, at Mysore, India, with the focal theme, **"MODERN TRENDS & PERSPECTIVES IN FOOD PACKAGING FOR 21ST CENTURY"**.

The Convention is aimed at providing a forum for interchange of ideas among academia, industry professionals and policy makers concerned with food packaging in order to set an enabling environment for the much needed quantum jumps to effectively meet the challenges of the new century.

ICFOST-2000 will have technical sessions on the focal theme with invited oral presentations by eminent experts in the food packaging area. The Convention will also hold poster sessions wherein papers based on original research work in all areas of food science and technology will be presented by various researchers.

TECHNICAL PROGRAMME

Technical Sessions

A total of five technical sessions are planned which include lead papers and keynote presentations by eminent persons with rich experience in their respective areas:

- * Global trends and policies in Food Packaging.
- * Packaging materials, forms and performance.
- * Newer technologies, processes and systems.
- * Eco-friendly packaging.
- * Source reduction, Quality standards and Information systems.

The proceedings at the presentations at ICFOST-2000 will be published by AFST(I) soon after the conclusion of the convention.

Poster Sessions

Original research papers on different aspects of food packaging as well as all other areas of food science and technology will be presented in the poster sessions.

Video Conferencing

There will be a special video conferencing session. Eminent speakers who will not be able to present in the convention will interact with the participants through video conferencing.

Plenary Session

The convention will conclude with a plenary session anchored by eminent persons from academia and industry and participated by all the delegates, who will deliberate on the important issues of immediate relevance to the development of food science and technology and formulate suitable recommendations.

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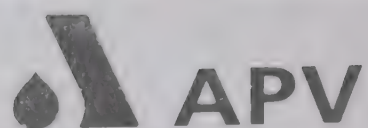
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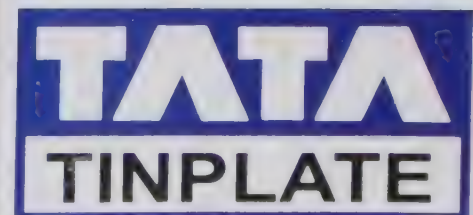
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Journal of the All India Food
Processors' Association



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Plight of Food Processing Industries

"What the right hand does, the left hand does not know". This common adage rightly describes the present policies of the Govt. of India. More than a decade ago, the Govt. established a separate Ministry of Food Processing Industries with the main objective of giving a big thrust to development of food processing industries in India. This sector was also publicised as "Sun-rise" industry. The sector did receive some fillip during 1992-1996 when the then Finance Minister had recognised its importance and scope of its growth and removed the levy of Excise Duty on processed food products particularly from fruits and vegetables, which are highly perishable in nature. During this period, the production of fruit & vegetable processed products increased by over 20%. Sadly enough, excise duty was reimposed in 1997-98 and in the Central Budget of 1999-2000, the levy was doubled from 8% to 16% under the plea of rationalisation. Likewise, the sales tax on processed Fruit & Vegetable products has also been jacked up by the State Govts. from 4% to 8% and in some cases to 12%. All these fiscal policies have caused deceleration of the Food Industry and also adversely affected both the internal demand and export potential. The tax levels in India are among the highest in the world. No other country imposes excise duty on processed foods.

It is heartening to note that the Deptt. of Food Processing Industries, Govt. of India has recently proposed a 10 year tax holiday so as to encourage the growth of Food Processing Industries. The Industry has also been pleading for removal of excise duty on processed foods. Excise and Sales Tax relief should be given to the Industry so that the benefit can be passed on to the consumers. Unlike in most other countries, processed foods in India are out of reach of the bulk of consumers. Exporters of processed foods should also continue to receive all the fiscal sops and incentives so that our exports really grow from year to year.

The biggest question, however, is "will the Ministry of Finance listen to all these oft-repeated pleas"? Let us wait and hope for the best.

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ASSOCIATION NEWS

To selected members,

I take this occasion to write to you to seek feedback and suggestions on certain important issues for further action.

First of all wish to refer to the decision taken by the government yesterday to increase the level of SSI exemption of Central Excise Duty from the existing Rs. 50 lacs to Rs. One crore. This has been a repeated request made by our Association to the government at the level of Hon'ble Prime Minister, Hon'ble Union Minister of Small scale Industries and The Development Commissioner, SSI, Govt. of India, for some time.

It is to be noted that the contribution of SSI towards national economy and its growing relevance in the present day global perspective has been appreciated. We hope that the spirit of growth of small enterprises will be maintained and necessary steps will be taken by the government from time to time for upgradation of Small Scale Industries. This will definitely go a long way towards a self-reliant and strong nation.

We are communicating our feelings in the above context to the govt. and on our part as members of the industry, we have to continue our efforts to achieve excellence

and hold our commitment to the process of nation building.

During the last Executive Committee Meeting held at New Delhi on 4.8.2000, the members expressed serious concern for the estimated decline in the growth of the food processing sector during the recent past. At the root of the concern lies apprehension regarding the financial health of the Industry and the difficulties arising out of adoption of WTO.

Presently, we are in the process of preparing our strategy for presentation for Union Budget discussions. I shall be grateful to receive your suggestions in this respect.

The following issues have been identified to be included in programme :

- a) To emphasise that there is a strong need for treating the 'Food processing sector' at 'Zero Duty' level. We need to strongly highlight that growing, harvesting, storage & processing are integral & 'processing' essentially helps to extend the shelf life of the natural produce. The relevance of this segment to the agriculturist & rural development is well known.
- b) To pursue for increase in the abatement level of Excise Duty

to at least 50%. In the Union Budget 2000, Excise Duty was increased from 8% to 16% which has further necessitated increase in the rate of abetment.

- c) To seek rationalisation of 'State Sales Tax' and 'Central Sales Tax' on food products from the present rate of 8% to 12% in most states to a maximum of 4%. This matter has also been consistently pursued in the past & it is important to have the concept of Sales Tax brought to a proper rationale.
- d) To seek clarifications & hold discussions regarding the adoption of the proposed VAT system.
- e) Issues arising out of adoption of WTO, in particular those having bearing on the economic viability & potential of the industry.

I request you to kindly send your inputs to us on the above points and any other issues you may like to advise so that steps can be intensified accordingly.

With regards,

Yours sincerely,

Sd/-

(Dr. S. Jindal)

Vice - President

A.I.F.P.A

★ ★ ★

Minutes of the meeting of the 4th Executive Committee held at Bangalore on 20th Oct., 2000 at 3.30 pm. in Hotel Rama, Lavella Road Bangalore

Sh. Gokul Patnaik, President presided over the meeting. The list of the members who attended is enclosed. Leave of absence was granted to those who could not attend.

President welcomed the members and mentioned about the raising of the exemption limit of the levy of Central Excise from Rs. 50 Lakhs to 1 Crore for Small Scale Sector and briefed the members about the constructive role played by AIFPA. The members welcomed the decision by clapping and applauding Government decision.

President wanted the members to keep pursuing at local levels with the State Governments and MPs and state legislators to constantly bring to their notice the issues relating to Central Excise, Sales Tax, imported products' effects on local markets and all matters affecting the industry right from the raw-material stage to consumer satisfaction. They must ensure a very positive role played by the States and Centre to frame policies favourable to develop food processing industry.

The present estimate shows a decline of around 10 percent in the processed food production. President highlighted that this is W.T.O. driven era. Industry has an

important role to play to improve the quality of their products and improve the overall efficiency of production.

There is a need to create awareness amongst small scale sector about W.T.O requirements. A.I.F.P.A has organised T.Q.M. programmes in several places including Chittoor and Krishnagiri. The objective of the Department of Food Processing Industries and A.I.F.P.A is to ensure upgradation of manufacturing systems by the small and tiny sectors. Besides the Association is planning to setup testing Laboratories at Chittoor and Krishnagiri but the industry at both the places must take upon themselves to make the scheme operative and self supporting.

The Association is planning to setup a Portal site feeding data about the processed food technology and commercial information, prices and growth achieved besides national and international information of commercial importance.

President suggested that the local chapters must meet regularly and he was confident that sharing knowledge will help the growth of each unit. Zonal/Chapter Chairmen were requested to convene monthly meetings.

President invited Mr. P.T. Raju, Zonal Chairman, South Zone to brief about the activities of the Zone during his tenure.

In his short presentation Shri Raju raised the following issues.

1. T.Q.M Seminar at Chittoor and Krishnagiri were held during this period.
2. There was a need to appoint a new person as Zonal Chairman.
3. Association works more effectively in North. More attention is needed for South Zone.

Shri Bijay Kumar as West Zone Chairman addressing the members highlighted the activities and issues.

- a) Four Seminars were conducted in different places in Maharashtra highlighting the problems and solutions for the growth of Food Processing Industries.
- b) Impact of W.T.O. and its implementation.
- c) Import and marketing of orange juices from Brazil.
- d) Role of market committees in handling issues like price and supply of raw-materials.
- e) Setting-up of Training Centre at Maharashtra Agro.
- f) Need for strict compliance of P.F.A. regulations for imported products. Sh. Bijay Kumar complimented the Association for the idea to setup a Portal site for the Processed Food Industry.

President intervening in the discussion commented that the W.T.O. implementation is compitable. Steps have also been

suggested to P.F.A. authorities that the importers of the products must give their name and address and a certificate that the product conforms to Indian Food Laws.

Sh. Gokul Patnaik informed that the Association is poised to ensure industry - friendly 'Food Laws' and 'National Policy' on Food Processing Industries.

President invited representatives and chapter chairmen from various zones to speak and bring out the issues in their respective areas/ fields.

Sh. George Issac, Chapter Chairman stated that the PFA act 1954 is arbitrary and irrational laws, rules and regulations. They do not help the industries' cause of the honest processors and canners. He raised the issue of definition of word "adulteration". Shri Isaac brought out the history of the last few years' efforts and AIFPA have been trying hard to get the P.F.A. Act amended and follow the guidelines with the Codex Standard. He wanted authority to make provisions and not to leave the interpretation at Food Inspectors level. He cited the penalty clause and desired that such a decision should be left with the Courts. He also suggested that the Govt. should make industry and consumers-friendly food laws.

Mr. Ravinder Nath from Chittoor raised the following issues:

1. Pollution Control on liquid

based and disposal of solid waste.

2. Small units of Chittoor must be assisted by the big export houses for upgradation of factory operation in and around processed units.

3. Setting up of the food testing laboratory at Chittoor. He desired that this initiative should be taken up by AIFPA.

President informed that it is a good idea to setup the food testing laboratory at Chittoor by AIFPA. But industry must ensure that this project is viable and continue upgrading and should assist with the local entrepreneurs.

Mr. Venkatswamy from Krishnagiri wanted that laboratory for testing the products may be set up at Krishnagiri and also, there was a need to stabilize prices of mango as raw-material since every year there are wide fluctuations.

President suggested that this matter may be pursued with Department of Food processing Industries for creating "price stabilisation fund". He requested the industry members to send their suggestions and proposals for examining and discussion with Department of Food Processing Industries. Mr. T.G. Mathew of Bolt's Indian Condiments (P) Ltd., Bangalore highlighted the size of Indian market and foreigners want to take advantage of purchasing power of Indians. However we have to be more cautious to allow foreign investment only in strategic areas.

Mr. Rao, Jagdale Food Industry, desired that the import of food stuffs in to India must conform to PFA-FPO standard. The ingredients which are not allowed, should not be permitted in imported food stuffs. He desired that R&D Centre for Mango Products must be established so that more new products and improved varieties may be used by processors. He wanted other fruits and vegetables be explored to increase the period of processing. He desired that there is a need for mutual discussion to take up the relevant issues with Department of Food Processing. Pollution Control measures are the need of the country and industry friendly pollution control measures must be developed in some type of package form.

Shri O.P.Gera suggested that the machinery is available for the utilisation of solid waste. Industry instead of depending on imported solutions must utilise local technology.

Shri Balakrishna Reddy from Chittoor, wanted the following issues to be attended urgently :

1. Collection of data for processed food products.

2. More farm to produce commercial varieties of Mangoes must be undertaken

3. Mango drink should be popularised. Some type of disposable packaging material must be developed.

4. W.T.O. in his opinion is suicidal for the Country and its implementation needs to be seriously examined.

President agreed that all are concerned about W.T.O. provisions and Govt. is taking steps to make WTO provisions Industry - friendly. However, Industry must send data to assist Govt. in taking up their concerns.

President then took up the listed agenda items.

1. Adoption of minutes of third Executive Committee meeting held on 30.06.2000 at Mumbai - The minutes were approved.

2. President briefed about setting-up of a website of the Association free of cost. The proposal was approved.

3. Discussion on formulation of India's stand on the issue of market access, domestic support and export subsidy commitments under WTO agreements. President desired that specific suggestions by the industry on each aspect may be sent by the industry so that Government representatives at WTO meet may take up all issues.

4. Corporate Membership and raising the funds to increase the activities of the Association such as setting up of testing laboratories, R&D Centres etc.

President desired that there was a need to increase the activities of the Association.

Due to financial difficulties, it is not possible to undertake more activities. As per decision taken in last AGM, we have requested all the large industry to convert their membership in the Corporate category. The amount so received will be kept in Corporate fund and income will be utilised for setting-up testing laboratories and R&D Centres in the country. Members were requested to cooperate.

5. Collection of outstanding

President reviewed the outstanding dues from the South Zone members on account of Membership fees. This was a matter of serious concern and requested Mr. P.T.Raju to pursue this matter with the members to send their outstanding dues by end of November, 2000.

6. Any other item with the permission of the Chair :

President informed the members that he wanted to bring out a Newsletter of about 16 pages every month and publish our technical journal "Indian Food Packer" quarterly. The objective is to serve the industry with latest information of commercial importance through the monthly newsletter.

The meeting ended with thanks to the Chair and members were invited to heavy tea by Zonal Chairman Mr. P.T.Raju. Tea was sponsored by Mr. Syed Mateen Aga.

K.P.Sarin

Executive Secretary.

★ ★ ★

Seminar on Food Processing

A.I.F.P.A in collaboration with TAFCON Group and sponsored by APEDA had organized a Seminar on 5th October, 2000 on "Development in Food Processing & Packaging Technology" at Pragati Maidan, New Delhi. It was inaugurated by Shri Omesh Saigal, Secretary, Dept. of Food Processing Industries, Govt. of India, New Delhi.

In his welcome address, Shri Gokul Patnaik, President of AIFPA referred to the recent fiscal measures adopted by the Govt., which are a disincentive to the Food Processing Industries in India. Excise duty on various processed food products has been increased by the Govt. of India from 8 to 16% in the last budget while Sales Tax has also been jacked up from 4 to 12% by the States in the wake of rationalisation. All this has meant a death knell on the Food Processing Industry which will decelerate if remedial measures are not taken immediately. He appealed to the Secretary to kindly initiate urgent action in this regard and help the growth of the Industry.

Inaugurating the Seminar, Mr. Omesh Saigal mentioned that the Department of Food Processing Industries is now engaged in preparing a document for simplification of food laws so that it becomes user-friendly. He also indicated that the Dept. is framing

a National Food Processing Policy. He stressed the need to incorporate new technologies for improving quality of food products and value-addition to meet the national & international standards which will help in increasing India's exports in food products.

The morning Session of the Seminar was on "Technological innovations on Processing & Quality Control" in which New Technological Options for Development of Rural and Small Scale Food Processing Industries were discussed.

Other subjects covered were: New Methods for Analysis of Texture of Food Products, to Improve food Quality and "Technology Gaps in the development of food Processing Equipments. In the afternoon session, papers on : "Can Corrosion" and "food Grade tin containers" were presented. The Seminar was attended by 120 delegates and it was of immense use for the benefit of the food processing Industry in India.

★ ★ ★

Minutes of TQM Workshop held on 11th Oct., 2000 at Hotel Kaveri, Rajkot.

A workshop on TQM was arranged by the Vadodara Chapter of AIFPA at Hotel Kaveri, Rajkot with financial assistance from the Department of Food Processing Industries, Govt. of India, New

Delhi on 11th Oct., 2000. This workshop is the second workshop of its kind in Gujarat arranged by the AIFPA, Vadodara Chapter. The first one was held at Vadodara in March, 2000.

Chapter Chairman Mr. Vijay Shah, explained the need for organizing such workshop at Rajkot and also explained in detail the activity of the Association and the assistance being provided by different Government Agencies in getting Quality Certification. He introduced the Speakers with their brief resume and urged the participants to implement the Quality Management at all levels in the units in overall interest.

Mr. Chandresh Shah, CEO, Madhav Foods, Dabhasa was the main Speaker, apart from Dr. Sakrikar from QAS, Mumbai and Dr. Namrata Wakhloo of Paradigm Services, Pune.

Mr. Shah, briefed the participants about TQM procedure, the importance of TQM in Food industries, and implementation of the same for benefit of the industries. He explained the entire procedure with live examples and in local language, which was well understood by participants.

Dr. Sakrikar, GM, Western Region, QAS, explained in detail the procedure regarding HACCP, its importance, implementation and the benefit for the system.

Dr. Namrata explained the system and how they can facilitate the unit in getting the HACCP and other related Quality Certification for the Food Industries. Dr. Namrata is the first & only lady Food Safety Auditor in India.

More than 30 participants from different groups of food industries took part in this workshop. This includes units manufacturing Spices, Namkeen, Khakhara, Papad, Canned Mango Pulp, Biscuits, Chevda etc.

Mr. Jitubhai Adani of Adani group of industries and Mr. Satish Khakhar of Rainbow group of Industries played a major role in the success of the entire seminar and without their active co-operation this was not possible. Mr. Jitubhai also assured that in the near future, majority of Spice manufacturing and other food Industries from Saurashtra region will become members of AIFPA and will also apply for the Quality Control Certification, keeping in mind the need for the same in the new WTO regime.

The workshop was well attended by the participants and good coverage was given by the local media and press representatives.

The meeting ended with vote of thanks from Chapter Chairman.

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FOOD PROCESSING SEMINAR



Shri T. H. Choaba Singh, Hon'ble Union Minister of State for Food Processing Industries, inaugurating the 2nd International Dairy & Food Technology Seminar organised by AIFPA & TAFCON from 3-6 October, 2000 at Pragati Maidan, New Delhi.

TQM WORKSHOP AT RAJKOT



Dr. Satrikar, GM, Western Region, QAS addressing the participants.



A view of participants

NEWS ROUND UP

CFTRI gets ISO 9001 Certification

The Central Food Technological Research Institute (CFTRI), Mysore, has received ISO 9001 Certification from Lloyd's Register of Quality Assurance for Research & Development, Consultancy and Training for Agro Food Products. The certification comes after rigorous auditing of the standard operating procedures for quality assurance. With the certification, the institute has joined the handful of CSIR institutions certified for maintaining global standards of R&D and other services.

Congratulating the entire staff of CFTRI for putting up untiring and enthusiastic hard work towards attaining this goal, Dr V. Prakash, Director, CFTRI, said that the certification is a landmark in the history of CFTRI which in the past 50 years of its service has made significant achievements in the food processing sector and rural development in the country, besides contributing a large share to the national economy. "The institute has always placed emphasis on quality in its various activities and the ISO certification is a global recognition of that fact and takes further high

in the R&D area of Food Science and Technology", he said.

CSIR News

15.08.2000



'Jack fruit processing can be fruitful SSI venture'

Food processing need not be only about multinationals and huge investments. While there are numerous problems associated with the industry and the Union Government is preparing to pass the Processed Foods Development Bill in parliament, it has overlooked the development of the industry at a micro, cottage industry level, according to industry sources.

The Government is also conducting a roadshow to elicit suggestions and comments from industry members on the National Food Processing Policy.

The industry could include something as simple as the humble jackfruit, said Mr. B. S. Bhat, Managing Director of Polykorp, the bakery which manufactures the Beekays brand of bakery products.

Jackfruit is grown throughout Karnataka on the coffee and tea estates in six districts in the State

including Mandya, Mysore and Bangalore. The fruit grows between March and August. In the first three months, it is traditionally converted to "papad", which can be used any time of the year. When the fruit ripens, it is boiled, and jaggery is added to it and it is stored to make "kheer".

The same storage skills and knowledge could be exploited to create a small-scale industry out of jackfruit, said Mr. Bhat, who made his suggestion informally to the Government officials at a recent workshop on "Agriculture and processed foods organised by GMCI".

This would greatly benefit the rural economy, which are now forced to become market-oriented as Dr. Dwarakinath, Chairman of Karnataka's Agriculture Commission, put it. Farmers are no longer looking at simple self-sufficiency but are geared towards growing enough to market commercially, according to him.

However, what was missing in the chain was the last link, a marketing infrastructure. This was where the Government could get the rural women (who generally do this work) to process two to five kg of

jackfruit each and make around 100-200 *papads*, which could be collected and marketed.

The simple scheme does not demand an additional investment, power, or any other infrastructure. Besides, jack fruit grows almost wild, without any application of fertilisers and pesticides, making it a pure organic product.

The Business Line 26.8.2000



Steps taken for automatic FDI route for processed foods

The government has taken a number of policy initiatives including the automatic approval of foreign equity upto 100 per cent for most of the processed food items except alcohol and beer subject to certain conditions.

Stating this, minister of state for food processing industries, Chaoba Singh informed the Rajya Sabha that the government was all for the policy initiatives to promote the growth of the processed foods sector and had schemes like financial assistance in the form of soft loans and grants that were provided to the private as well as the public sector companies, NGOs, cooperatives, HRD organisations and R & D institutions.

The Business Line 26.8.2000



Food processing policy soon

The Department of Food Processing Industries (DFPI), Ministry of Agriculture, is in the process of formulating a national food processing policy, which would be announced soon, according to the DFPI Deputy Secretary, Mr. A.K. Goyal.

He made this announcement while delivering the key-note address at a one-day seminar on Promotion of food processing industries' here, organised by the Andhra Pradesh Industrial Development Corporation (APIDC) in association with DFPI.

According to Mr. Goyal, "the need for such a policy has been felt over a long period. The proposed policy is to be discussed with various interest groups to elicit their views and suggestions. The policy would address all issues connected with food processing industry starting from production of raw material to marketing."

The department is also in the process of formulating a Food Processing Industries Development Act to address various concerns of the sector and also to provide single-window clearance, Mr. Goyal said.

The Agriculture Ministry has also decided to implement a scheme for setting up food processing industrial estates and food parks. "The concept is based on locating

activities of food processing in one location to create cost and infrastructure efficiencies for the business involved and improve the viability and profitability of the units."

According to Mr. Goyal, a well designed and professionally managed food park could be one option where food processing industry could look for long-term advantage, considering the need of the hour and constraints faced by the industry in the competitive environment. The food park concept was adaptable to processing a variety of products, including fruits and vegetables, cereals, speciality foods, meat products, food-based nutraceuticals etc.

Stating that an assistance of up to Rs. 4 crores was available from the Centre for common facilities in the food park, Mr. Goyal urged the Andhra Pradesh Government and its PSUs to come forward to set up such parks in the State. "Two such parks can be financed in Andhra Pradesh by the Union Government", he said.

Inaugurating the seminar, the Andhra Pradesh Minister for Major Industries, Commerce & Export Promotion, Mr. K. Vidyadhar Rao, said the food processing industry was facing constraints such as post-harvest losses and absence of modern processing facilities and internationally acceptable

packaging requirements. If these issues were not resolved, they would have a cascading effect on the industry preventing it from achieving optimum capacity utilisation and pricing, he added.

Further, large-scale investments in private sector were very much essential apart from the Government support and active role by farm cooperatives to exploit the real potential in the sector, Mr. Rao said.

Business Line

28.8.2000



Single authority for all food laws on anvil

The proposed Processed Food Development Bill is likely to be introduced during the winter session of Parliament, the Secretary, Department of Food Processing Industries, Ministry of Agriculture, Mr. Omesh Saigal, has said.

The Ministry hopes to finalise the first draft of the Bill by the end of September after discussions with the industry and Government participants. The draft Bill will require the Union Cabinet's approval before it is introduced in Parliament.

According to Mr. Saigal, the main objective of the proposed Act is to create a single authority to administer all the food laws under a single umbrella.

Today, the Prevention of Food

Adulteration Act (PFA) of 1954, acted as an impediment to the food processing industry, Mr. Saigal told the delegates at the seminar on National Policy on Food Processing in Mumbai.

The PFA Act, Fruits Products Order, Meat Products Order, Milk and Milk Products Order will be covered under this proposed Act rendering the provisions in the Essential Commodities Act, 1954 redundant.

The proposed Bill will also take into consideration standardisation and will be defined in a manner as to include imported goods. The new Act will include provisions of the Agricultural Produce Grading and Marketing Act (AG-MARK), Standards of Weights and Measures Rules and Export (Quality Control & Inspection) Act.

The Act will contain provisions for granting incentives to merit based processed foods and will define merit goods and futures trading.

The Union Minister of State for Food Processing Industries, Mr. Chaoba Singh, said there were multiple agencies dealing with food laws leading to a lot of negative inputs hampering the growth of the food processing industries.

The proposed Bill would take into account all aspects of the development of the processed food

sector and would cover not only food laws, but also include development fund, equalisation fund, futures market, compulsory standards in line with Codex Alimentarius, he said.

The efforts of the Government was not to limit the entire discussion only to find ways and means of reducing wastage, but to evolve an all-India model which would ensure a pro-active, industry-oriented approach to enable the industry to grow in a modern, scientific and well-planned manner. This would create a win-win situation for all the players in the field including farmers, processors, industrialists and the Government, the Minister added.

Mr. Singh said the processed food sector provided for a high index of employment. Quoting a study, he said for every Rs. 1,000 crores invested in food processing industry, the sector generated employment to 39,000 people compared to 31,300 in the textile sector and 22,300 in the paper industry.

In his inaugural address, the Chief Minister of Maharashtra, Mr. Vilasrao Deshmukh, called upon the Centre to give consideration to important issues such as creation of infrastructure like cold chains between farm and market place, warehouses suitable for perishables, creation of facilities in local

agricultural produce markets, transparency in auction system, dissemination of market information system etc., while shaping the national food processing policy.

Speakers at the seminar said the food processing industry was of enormous significance for the country's development because of the vital linkages and synergies that it promoted between industry and agriculture.

India had an advantage in food processing industry because of the varying agro-climatic conditions. However, the food processing industry was facing a negative growth of five per cent in the last two years.

The food processing industry witnessed a 20-per cent growth during the period from 1991 to 1998 when the sector was liberalised. But in the last two years, the growth trend had turned negative due to high incidence of taxation. Currently, tax incidence stands at 28 per cent.

The approach paper towards formulation of national policy on food processing industry had identified tax levels on processed foods as among the highest in the world, "Multiple and complicated tax regimes have made food industry uncompetitive," it said.

In India, the value-addition to food fortification is seven per cent

compared to 23 per cent in China, 45 per cent in the Philippines and 188 per cent in the UK.

The food processing sector had been characterised by poor marketing, transport and communication infrastructure, the paper said. "There is lack of integration of local markets with national and international markets to support faster and more diversified growth," it added.

The new policy on food processing aims to create an enabling environment, look into infrastructure development and backward and forward linkages.

Business Line 30.8.2000



Unsafe packaged food products

The report regarding adulteration of packaged flour is of great concern because of the huge number of people who use packaged *atta* and the possible implication this can have on their health. Adding to the complexity is the involvement of top fast moving consumer goods companies in the business of packaged food products, including flour.

Quality of food has a direct bearing on the quality of the life one leads. Unfortunately, it has come to notice that big companies with their high voltage advertising are trying to fool people and selling

adulterated flour to the general public.

According to a recent study conducted by CERS, an Ahmedabad-based consumer rights organisation, out of 13 branded flour samples and three loose samples - including brands from the HLL and Godrej, that is Annapurna and Pillsbury respectively - tested, none of the samples passed the test.

Various dangerous chemical components found in the samples are DDT, Aldrin, Ethion etc. These chemicals are highly toxic, hence banned from use on crops. Other adulterants like rodent or insect body parts were found in almost all samples. Presence of dust and sand was also noticed.

All the advertisements of packaged flour brands from FMCG companies emphasise the quality products they provide and charge premium price for the products. But after this test, their quality claims have come under clouds of suspicion.

Considering the fact that contamination of packaged flour affects the health and well being of millions of countrymen, it would be proper for the government to have a fresh look at their accreditation by conducting a test exercise similar to the one carried out by CERS.

Observer 31.8.2000



Organic food certification scheme being formulated

To offset the impending threat of soil and environmental degradation, alternate, eco-friendly use of land cultivation particularly of edible crops is necessary. Organic farming offers such as alternative as all activities under it are focussed building up soil fertility through the adoption of crop management methods suitable to site-specific situations.

The concept extends from farm to post-harvest management of crop including storage, processing packaging, transportation and handling exports. It involves careful monitoring and certification at all stages from farming to the product consumption level.

Though organic farming is native to India, the European Union, the US, Australia, New Zealand, Japan and Latin America have emerged as major consumers of organic food such as cereals, fruits, vegetables, oils, wines and dairy products.

Organic cultivation conforms to standards which are well established in the developed world. The Indian national organic standards and certification scheme is being formulated and is likely to be adopted in the next three years.

The withdrawal of chemical fertilisers and pesticides could result in a drop in crop yields initially. But the country has to overcome the hiccups in order to tap the huge export market potential. Organic food products have a growing domestic as well as global market and fetch premium prices over conventional products.

The country has evolved standards for horticulture crops on the lines of those of EU. As part of this, importance is given to soil and water conservation measures such as planting nitrogen fixing legumes around the field boundary and use of organic manures to conserve moisture. Bio-fertilisers assume importance as they offer an additional, renewable and economic source of nitrogen for agriculture. Rhizobium, Azospirillum, Acetobacter and Phosphobacteria have been found to be useful for paddy, sugarcane, groundnut soyabean, cotton, wheat, pulses, tea and vegetable crops.

Bio-fertiliser application is known to reduce the input cost and increase crop yields by 10-70 per cent, depending on the agroclimatic conditions. For small and marginal farmers with limited resources, bio-fertilisers have proved to be beneficial.

Observer

31.8.2000



Plasma coating process garners packaging awards

Sidel's ACTIS (Amorphous Carbon Treatment on Internal Surface) barrier treatment process of PET bottles has sealed its presence with two industry awards - the IFEC's (French Packaging Institute) Packaging Oscar, and a WorldStar Award in the "beverages and alcohol" category from the US-based World Packaging Organisation.

The honours pointed at the significance of the technology in increasing barrier properties of traditional, single-layer PET bottles by 30 times for oxygen and 7 times for CO₂. With applications in beer bottling, carbonated soft drinks and other oxygen sensitive beverages, ACTIS applies a layer of highly hydrogenated amorphous carbon unto the inside of a standard single-layer PET bottle. The carbon is produced from a food-safe gas in its plasma or ionised state and forms a protective barrier, about 0.1 micron thick that is 100 percent recyclable.

The plasma treatment process is done using a machine installed downstream from the PET blow-moulding machine. The first model available, ACTIS 20, has 20 stations which together can process 10,000 bottles per hour for sizes of up to 0.6 litres. Taste tests by two independent bodies - Jorgensen of Denmark and Qualtech -IFBM of

rance - have found no discernible difference in quality between beer in ACTIS treated PET bottles and glass bottles over a six-month period.

A key feature of ACTIS is its low cost per bottle, which Sidel says is less than competing packages for 33 cl and 50 cl size containers. The coating also amounts to just 1/10,000th of the total package weight. The first ACTIS 20 machines were delivered in December 1999 to the US and Brasil.

Asia Pacific Food Industry March 2000



New Starches for a chewy texture

National Starch & Chemical has launched another product in its Elastigel™ range of speciality starches, designed specifically for the confectionery market.

Elastigel™ 2000 is ideal for producing a chewy texture in chewy candy, soft candy, caramel candy and low boiled candy. Traditionally, gelatine is used as the gelling agent in these types of confectionery products. However, due to cultural, religious and dietary reasons, it is unacceptable in many countries and market segments that desire gelatine-free vegetarian candy. The new starch can totally replace gelatine and other hydrocolloids such as gum arabic and gum tragacanth. Hence, chewy candy made with

this starch system can be declared *halal*, *kosher* and vegetarian.

Elastigel™ 2000 can be used in most confectionery systems without changing the manufacturing process. It does not require high temperature activation and can be used in kettle cookers and static cookers, as well as in continuous processes such as jet cookers or tubular heat exchangers. It also possesses low heat viscosity. Candies produced with the new starch are non-sticky and have a long-lasting chew, similar to that imparted by gelatine. The levels used can be varied to achieve the desired degree of hardness and chewiness.

In addition, the candies will have excellent flavour release.

Elastigel™ 2000 is stable even in hot climates. Deformation at high temperatures, shrinkage and cold flow are prevented, leading to improved shelf life.

In further developments, National Starch & Chemicals Dry-Tack™ adhesion system received High Honours recognition in the ingredients category of the 1999 Food Processing Awards, presented at the Worldwide Food Expo in October last year.

Dry-Tack™ adhesion system is a free-flowing dry powder that adheres seasonings to snacks. The specialty product is pre-blended

with seasonings, applied while the substrate is hot and melts in less than 30 seconds. The powder keeps the seasonings firmly attached and since no oil or other liquids are needed, the snacks remain crisp and dry. Because of the secure bonding of the seasoning to the snack, only a minimal amount of seasoning falls to the bottom of the packaging that contains the snacks.

Asia Pacific Food Industry March 2000



Drink of the millennium: It's chai for good health and not the fizz

It is now common knowledge that tea has been consumed by humans for many millenniums. But did you know that tea is the only beverage which does not contain even a single harmful ingredient? Indeed research around the world has shown that consumption of tea prevents several ailments such as cancer, arthritis, hypertension, skin diseases and heart problems. Dr John Weisburger of the American Health Foundation declares that "drinking two to five cups of brewed tea a day is associated with risk reduction for disease in humans".

We in India (also other third world countries) are facing a situation where multinationals with deep pockets are changing the basic habits of our population -

particularly the younger generation. Be it highly processed breakfast foods laced with preservatives and of doubtful nutrition value or coloured water with lots of sugar, carbonic acid, "secret" ingredients and of course excess of fizz and hype! All this to the detriment of our health as also our agri-economy.

Let us first summarise the more important health benefits of tea which bear certification from world renowned scientists like Prof C S Yang of the University of New Jersey, USA, Dr Hasan Mukhtar of Case Western University, USA, Dr Siddiqui of National Cancer Institute, Calcutta, Dr Y Hara of Food Research Laboratory, Japan and Mr Thomas Nellisery of Hindustan Lever Research Foundation.

1. Tea has anti-bacterial and anti-viral attributes.
2. Tea drinking reduces the risk of coronary heart diseases, cholesterol, hypertension; also cancer of the lung, throat, breast, colon & prostate.
3. The caffeine in tea (50 mg per cup against 125 mg per cup of coffee) has a different & unique molecular structure which imparts a beneficial biochemical effect on the tea polyphenols. Polyphenols in tea are powerful anti-oxidants against free radicals which are known to cause heart disease, many types of cancer & other ailments.

4. Dr. Hara who is a world authority on Tea Polyphenols has in fact patented concentrated capsules of tea polyphenols for prophylactic use, particularly for intestinal bacterial flora. Japanese research also maintains that drinking two cups of tea per day could cut off the risk of a heart attack by 44% because tea contains flavonoids which make blood cells less prone to clotting.

This Indian super drink -grown and processed by our own farmers and giving employment to over 10 million people - is now facing the challenge of the mighty multinationals who have unleashed vigorous advertising campaigns to corrupt the younger generation in particular. And what are these colas and carbonated soft drinks? Actually they are anything but soft on your body, except for your teeth. Dr. Clive McCay of Cornell University showed that soft drinks can completely erode tooth enamel and make teeth as soft as mush. Some of you may have heard about the kid who dropped his broken tooth in a bottle of cola - it dissolved in 10 days! Imagine the damage to our tender digestive system.

There is enough evidence that most carbonated sweet drinks contain the horrific concoction called phosphoric acid; they also contain malic acid, carbonic acid & erythorbic acid (all fractionated & extracted with heat and therefore

harmful). They also have other harmful ingredients like 5 teaspoons of white sugar in a normal serving and ethylene glycol - a sort of antifreeze to achieve a real chill but unfortunately considered to be a slow poison of the caliber of arsenic!

When cold soft drinks are taken with food they destroy the enzymes and cause fermentation instead of helping digestion.

And beware of diet colas which contain a substitute (instead of white sugar) so harmful that each container has to have a warning label just like cigarettes!

Tea on the other hand, contains no additives, no fat or sugar, no calories and no preservatives. It is a natural eco-friendly drink prepared with boiling water that becomes sterile and is sipped at a warm temperature which is good for the system. Tea revives & relaxes - by physiological stimulation and by rapidly increasing mental alertness over a longer period. And yet it is a cheap beverage costing less than a quarter of the price of a harmful fizzy drink.

It is indeed tragic that parents who themselves enjoy tea, keep it away from children due to the mistaken belief that tea is harmful for growing kids. By all means give them milk but let them also assimilate the benefits of tea in their developing years. This is what

happens in Japan, China, Korea, Indonesia and many other eastern countries; it is refreshing to see their children carrying flasks of green tea with their school bags. It is no surprise that they have a healthy and cheerful young population who do much better than we Indians in sports & Olympics!

Surprisingly the same Indian parents who forbid tea for children happily allow them to consume the lethal carbonated soft drinks. It is indeed criminal to push children to an addictive existence with a much greater risk of "modern" ailments like cancer, heart disease & hypertension so common in the West. Developed countries like USA, Europe & Japan are already realising the health benefits of tea and are consuming larger quantities of hot and cold (iced) tea. You may be surprised to learn that for commercial reasons Coca Cola Co. sells more cartons of bottled green tea in Japan as compared to Coke. It will surely be a paradox if we Indians have to learn the benefits & habit of tea drinking from the West - somewhat like Yoga & meditation!

We are at the threshold of a new millenium; let it not be just a point in time in human history. Let us make it a turning point in the history of the tea industry by disseminating correct information

about the benefits of tea. It is high time that we in India realise the game of the multinationals to destroy our agri-economy by replacing a healthy drink like tea with colored carbonated water. It is as if Uncle Sam is trying to reenact the Boston Tea Party on Indian shores! Drink of the millenium? Surely chai.

(The writer is an industry consultant with a passion for tea. the views expressed are that of his own and not of the paper)

Economic times

2.10.2000



Focus on Hybrid Rice Cultivation: Expert

India must focus on accelerating its hybrid rice cultivation programme. Hybrid cultivation is the answer if this country has to meet the demand from its growing population. Hybrid rice cultivation could help the country see an additional two million tonnes of rice being produced annually, Dr S S Virmani, plant breeder and deputy head of plant breeding, genetics and bio-chemistry division at the International Rice Research institute (IRRI), Philippines, told ET.

Current estimates place the area under hybrid rice cultivation in India at about 1,50,000 hectares, against a total rice acreage of about 40 million hectares.

The area under hybrid rice thus works out to less than half a per cent.

It is estimated that China has close to 15 million hectares under hybrid rice cultivation. India should, Dr. Virmani said, draw up a plan to increase the acreage to about two million hectares by 2005-06. The IRRI was willing to collaborate and help develop more varieties of hybrid rice suited to the Indian conditions, he added. It must however be admitted, added Dr. Virmani, that India started hybrid rice cultivation only in the mid 90s as against China, which adopted it some 25 years ago.

Interestingly, IRRI's research in hybrid rice cultivation started only in the early 80s.

"There are two major reasons for the success of hybrid rice cultivation in China. Nearly 50 per cent of China's rice production is hybrid and over 90 per cent of China's rice crop has assured supply of water," added Dr. Virmani.

Irrigation facilities cover only about 40 per cent of India's total cultivable land area. States like Haryana and Punjab for instance, have taken to hybrid rice cultivation in a big way, said Dr. Virmani.

Economic times

2.10.2000



Fruits, fresh from Farm

After making a mark in European supermarkets for almost a decade, Euro Fruits has recently launched fresh cut and ready-to-cook branded vegetables and packaged fresh fruits in Mumbai.

Are you looking for healthy fresh food options? Are you concerned about quality of the basic daily food products consumed by your family? If yes, look no further. Meet the company working with a mission to provide conveniently processed and packed fresh fruits and vegetables.

Euro Fruits, ranks among India's leading fresh fruit exporters, making a mark in European supermarkets for almost a decade. The company's exports have gone up from Rs 11 crore in 1998-99 to Rs 15 crore last year and the company expects it to touch Rs 20 crore during the current year.

It has recently launched in Mumbai fresh cut and ready-to-cook branded vegetables and packaged fresh fruits in about 60 select outlets. "We are implementing the recommendations of CII-McKinsey report in their letter and spirit by eliminating middlemen, preserving the cool chain and offering international experience in basic food products of daily use at Indian prices," says company director Nitin Agrawal. All the produce used is hand selected, whisked

from the fields to our processing plants. The raw product is then trimmed, cut, washed and spun dried.

Riding on the new wave of health-conscious consumers having exposure to western markets, the company has also added a number of imported fruits like apples, strawberry, mandarin, navel oranges, and kiwis to its produce basket. The company has entered into strategic alliance with Australia-India fresh fruit marketing initiative (AIFFA).

The company's efforts are well recognised by a number of central and state government agencies in the form of awards and testimonials. "The greatest rewards of course, is feedback from happy consumers, lauding the quality and convenience aspects of our products", says Nitin Agrawal. Internationally, 5-A-DAY programs for employees are common in most corporates wherein the companies advocate five servings of fresh fruits and vegetables every day.

This is perhaps the best initiative a company can take to preserve and enhance the inherent strengths of its most important business asset. Encouraged by the company's quality supplies, enlightened Indian corporates are keen to serve employees on the platter. Initially, the vegetables were available only at select stores in the city but now

it is freely available. the company maintains a cold chain from the farm to the table ensuring freshness and comes with an expiry date too. The company's hygiene standards are maintained through the imported cold chain technology which helps increase shelf life of these fruits and vegetables. Packaging for vegetable is done in a specific bag called 'permeable' bag which helps in maintaining the oxygen transmission rate. The concept helps in maintaining the shelf life for 8-10 days. The company, as of today, procures vegetables from its own farms based in Dhule and Nasik and other contract farms.

These vegetables are then processed in their factory (near Nasik). The process of maintaining shelf life includes post-harvest practices which involves bringing of vegetables from farm to factory in refrigerated vans, cleaning, cutting, washing at two degree Celsius, popularly known as hydro cooling (which kills bacteria), and finally the product is spin dried.

Economic times

2.10.2000



Bar Coding must for Exports from Dec 1

The commerce ministry has decided to make bar coding mandatory for all exports from December 1 and this has created a

flutter within the export community as several sectors, like handicrafts, are not prepared to meet the new standards. Bar coding makes identification of export goods simpler by specifying details like type of product, customs classification and grade, through a pattern of internationally-accepted symbols or numbers.

All finished and packaged items meant for retail sale have to carry a bar code, using international symbologies or numbering standards. Consignments not adhering to this requirement would not be cleared for shipment from December 1 onwards, commerce ministry officials said.

In case, an export consignment is not in finished and packaged state, the exporter concerned has to furnish a declaration to the customs department and claim exemption from bar coding. The idea is to bring labelling of Indian consignments to international standards, they said.

At the consignment level, it would be mandatory for exporters of readymade garments, engineering products, food products, pharmaceuticals, leather goods, sports goods, plastic goods and handicrafts packed in cartons, containers or drums or implement the new norm.

A notification to this effect has already been issued by DGFT. The

ministry had indicated its intention in the amended Exim Policy.

However, exporters said DGFT should have consulted export promotion bodies before finalising the date and modalities of the scheme. Such a promise had been made by the commerce ministry, but it has not been kept up, they added.

The argument of exporters is that bar coding is a complex issue and detailed preparations should be made before making it mandatory for Indian shipments.

In many cases, buyers send their own bar codes while in others they specify that they do not want any coding. Therefore, the mandatory bar coding specified by the government would create a lot of confusion, according to exporters.

They have also pointed out that airlines use their own bar coding system to identify consignments and the government should chalk out a detailed plan after taking these factors into consideration. There is a strong need to educate the export community about the new system and how it could be implemented without hindering business, exporters have argued. The issue is complex in the case of certain sectors like handicrafts as there are too many product specifications which keep changing from time to time.

The problems anticipated by the handicrafts sector has been taken up by the development commissioner in charge of handicrafts. This follows a representation from Export Promotion Council for Handicrafts (EPCH) chairman Ravi Passi, sources said.

It is understood that the Council has demanded a transition period of three years for the cottage-based handicraft sector.

Economic Times 3.10.2000



Agro park to promote food processing sector

One of the first industrial estates exclusively devoted to the food processing industry in India is wooing first - generation entrepreneurs and multinationals as it races to get all common support structures up and running by the month-end.

Wise Industrial Park Ltd. (WIPL), which has promoted the 112-acre "food park" in Ghaziabad, an industrial town bordering Delhi, is also setting up a marketing network in phases to facilitate the launch of new agro products by fledgling enterprises.

With an investment of Rs. 50 million and spread out on 12 acres, the common facilities include a 4,000 tonne capacity cold storage

and a 6,000 sq feet grading and packaging unit, WIPL managing director P C Rao said.

WIPL is a joint venture company formed by UP State Industrial Development Corporation (UPSIDC) and Wise Infrastructure Ltd. (WIL), a private enterprise with focus on infrastructure development.

"Inspired by the Israeli moshav system, the thrust of these projects is to promote agro industries through creation of a common infrastructure facility," Rao said. "In doing so the individual units would not be required to set up facilities which they do not use on a continuous basis or for which they do not have economics of scale. The state enterprises contribute their equity through land acquired by the government and the WIL bringing in the required funds for development," said Rao.

In this project, UPSIDC has an 11 per cent stake. The UP government has transferred 800 acres to UPSIDC through a conveyance deed with the provision that 400 acres of this be developed in a joint venture with a private company.

"Out of the 400 acres Agro Industrial Park being developed by us on Masuri Gulawati Road, in Ghaziabad district, 112 acres is earmarked for a Food Park. In this park we are setting up common

infrastructure consisting of cold storage, grading and packing center, waste management facility and other associated buildings with the support of the federal Department of Food Processing Industries. The remaining area has been earmarked for major industries which do not require much support facilities," said Rao.

The estimated cost of setting up the food parks is Rs. 177.5 million, with Rs. 72 million in the form of equity, Rs. 70 million raised through bank loans and the balance through accruals with the support of the government.

The project promoters are planning road shows in France later this month, to be followed up in the USA next year to attract multinationals and non-resident Indians to invest in a sector which enjoys several facilities including government subsidy, automatic route clearance and full repatriation of foreign direct investment. The Indian food processing industry currently contributes just two per cent of the global trade.

"We are in the process of finalizing around five new projects for frozen and tinned foods and one mineral water plant. Retiring defense personnel is another segment we are hoping to attract for setting up ventures and have held presentations for them," said Rao.

Advised by a panel of food consultants, the company is also

undertaking feasibility studies for young entrepreneurs and for sanction of submitted projects. It has also tied up with Rabo Bank of the Netherlands and Small Industries Development Bank of India for financing of projects over Rs. 10 million as part of its one window clearance facility for investors.

Economic Times

5.10.2000



US body to create market for processed potatoes in India

The National Potato Promotion Board of USA (NPPB) is keen to assess and create a market for processed potatoes in India.

The demand for a large-sized potato (French fries variety) has spurred following the spread of fast food centers and its culture, especially in the country's four metropolises.

NPPB wants to create an awareness of the nutritional value of potato and thus, create a demand for their product range of potatoes. "We are here to build ties with government agencies and trade bodies to boost the trade between the two countries," the board's ex-chairperson Helen Masser said at a press meet on Tuesday.

"The board can help boost consumer demand for various potato products on the one hand and also help farmers with seed programs

and food processors with technology on the other," she added.

India is the third largest producer of potatoes in the world with an annual production of 23 million tonnes. The US runs close behind 20 million tonnes per year.

The per capita annual consumption of potatoes in India is a meagre 24 kg, as against 65 kg in America, according to Dr Vinod Karnik, a nutritionist and food technologist. In the US, potato is seen as the staple diet, which explains for the high consumption of potatoes.

Speaking to *The Observer of Business and Politics*, William Wyse, CEO of the US-based Oregon Potato Council, an independent body for the development of potato industry said, "We are here to study the market for processed potatoes. The increased demand for processed potatoes and its products will automatically increase the demand for fresh potatoes. Ultimately, it will help the farmers to sell their stocks."

When asked whether this was just another market strategy to take over the Indian market by creating a demand for processed potato and other products, Mr Wyse clarified, "As per our studies, India has only 10,000 metric tonnes of processed potato market out of which 600-700 tonnes are home-grown. Only 300 metric tonnes are imported from the US. We expect the overall

demand to increase to 10,000 tonnes, with a proportionate increase in demand for Indian potatoes."

The board claims that its presence in the Indian market will act as a catalyst for the development of the domestic potato industry which is still in its nascent stage.

Observer

05.10.2000



New Symbol for Non-Veg Food Packages

Union government has made it mandatory for the food products having non-vegetarian ingredients like animals, birds and eggs to print a symbol on the package for identifying these products.

The symbol recently approved by the Department of Prevention of Food Adulteration, is a red colour circle with a single chord passing through its centre.

"The notification will come into effect from November 17", official sources told Business Standard.

"It has become compulsory to print the approved symbol on the packaged food which contains whole or part of any animal including birds, fresh water or marine animals, eggs as an ingredient," The sources said.

The department has also made it compulsory to print, the month

and year for which the product is best for consumption. "This notification has recently come into force," they said.

When contacted a Confederation of Indian Food Trade and Industry (CIFTI) official said, "at this stage we are studying the notification and would give a response soon".

"Large number of consumers would be benefited by this customer friendly government initiatives," Sunita Roy, executive secretary of consumer coordination council (CCC), a national coalition of consumer groups which lobbied with the PFA, said.

Business standard

05/10/2000



National policy for food processing industries on cards

A national policy for food processing industries which will bring in integrated development of the sector, is in the offing.

This was disclosed by minister of state for food processing industries Chaoba Singh at the inauguration of the second Dairy and Food Technology Expo 2000 here on Tuesday.

"The department of food processing industries is in the process of formulating a national policy for food processing industries, that will bring in

integrated development of this sector," he said. A comprehensive strategy for producing quality and safe dairy products should be formulated with suitable legal backup, he said adding that more value added products are likely to be imported in near future while lower value products would be exported.

With the demand for quality dairy products rising, efforts should be made to reduce cost of production by increasing productivity of animals, better health care and breeding facilities and management of dairy animals, he said.

"If India has to emerge as an exporting country, it is important that we should develop proper production, processing and marketing infrastructure, which is capable of meeting international quality requirements," Mr Singh said while pointing out that India would focus on buffalo milk based speciality products tailored to meet the needs of the target consumers.

Stating that food processing sector had been deregulated and 100 per cent foreign investment allowed, Mr Singh said that Rs 19,100 crore, including Rs 9,100 crore by foreign investors, had been invested in the sector since July 1991.

Mr Singh said that the milk

processing industry was consuming only 10 per cent of the total milk produced and added that with the development of value-added products and the improvement of the transport systems of the dairy industry, the organized sector was gaining market share from the unorganized sector.

Stating that the government had given top priority to developing the food processing sector, he said that 100 per cent Export Oriented Units (EOUs) had been permitted to import raw materials and capital goods free of duty.

"The department of food processing industries has launched concessional finance schemes covering the entire area of the activities involved with food processing such as post harvest infrastructure including cold chain, food quality and safety, packaging research and development and promotion of processed foods," he added.

Earlier, Germany's minister of state for food and agriculture Gerald Thalhenn said that involving developing countries in crucial world trade rounds on agriculture was crucial for the outcome of World Trade Organisation (WTO) agreement on agriculture.

Observer

04/10/2000



UP seeks foreign tieup for food parks

Uttar Pradesh is currently scouting for foreign partners to invest in its upcoming agro-industrial food parks with a total outlay of Rs 940 crore.

The five food parks which would be set up in districts including Lucknow, Allahabad and Saharanpur would promote exports of agricultural goods.

The inflow of foreign investment would also help the state in meeting its short-term agricultural exports target of Rs 16 billion by 2001-02 which it has set for itself.

Currently, the government has identified Haldwani, Saharanpur, Lucknow, Allahabad and Hapur as ideal locations for the upcoming food parks and the Uttar Pradesh State Industrial Development Corporation (UPSIDC) is preparing a feasibility report for the venture, official sources said.

These areas have been identified as they have an abundant supply of raw material ranging from cereals to fruits and vegetables which are required to sustain any food park, sources said.

Moreover, the above cities are also ideal from the point of view of their proximity to wholesale markets, sources said adding these areas would be able to provide cool chain facilities which are an essential

requirement for handling perishable goods.

The proposed agro-industrial parks would offer common facilities for supporting and sustaining growth within the complex by providing customerised and industry specific infrastructure for the processing units thereby helping them in becoming competitive and self reliant.

The support infrastructure would include facilities like cold chain storage, water supply and drainage, uninterrupted power supply and other utilities, the sources added.

The food parks are partnered by various central institutions like the Department of Food Processing, National Bank for Agriculture and Rural Development (NABARD), Agricultural and Processed Foods Export Development Authority (APEDA), Exim Bank and the state government. At present exports of agricultural products from Uttar Pradesh including basmati rice, and fruits like mangoes constitute about 20 per cent of India's total exports.

Economic Times 3.10.2000



How the cookie crumbled

It's that time of the year - the time when Delhi's heart is full of the

festive spirit and the city sarkar's health ministry has its hands full with food samples. More specifically the run-up to the Y2K Diwali dhamaka sees an additon to the prevention of food adulteration (PFA) department's food-for thought list : biscuits. Yes, besides the usual suspects - confectionery, sweetmeats and other flavours of the festive season - It's foreign made biscuits (the cookie in American-speak) which are hogging the attention.

Explains PFA director Ashok Bakshi, "Biscuit manufacturers based in the Capital allege that while they are subjected to scrutiny and punishment for not adhering to the prescribed norms, the authorities concemed never lift samples from foreign-biscuit manufacturers, forget initiating action against them. Side by side, we have reason to believe that certain biscuit manufacturers doing brisk business under the garb of foreign labels are actually counterfeiters," Adding a twist to the tale is the ground reality that cookies are cleared by port health officials when they check into the country. What this means is that foreign-made biscuits do not figure prominently on the PFA's agenda. "Yes, we are authorised to lift samples of videshi biscuits, but for all practial purposes we play a very limited role in their screening. After all it is the responsibility of

port health officers to verify their authenticity and quality. At the same time, with specific cases having come to our notice, we have no option but to check out the cookies in the market."

Confirms Delhi health minister A K Walia "Glaring discrepancies in both the labelling as well as the composition of foreign-made biscuits have come to our notice and we are acting on the complaints received. Walia stresses that the government has issued instructions to the authorities concened to be at the ready this festival season "All 27 SDMs accompanied by PFA staff will have to keep a hawk-like watch on the food being sold in their respective areas. At the same time, considering the tremendous pressure the health ministry and the PFA department are under, we have requisitioned the services of other department personnel to provide assistance."

For a city infamous for the Delhi belly, a counterfeit copy of something as innocuous as the biscuit is, obviously, difficult to stomach. Fortunately, with the government seemingly serious about all things spurious, Delhiites are hoping that just this once, adulterators have bitten off more than they can chew.

The Times of India 9.10.2000



German firms keen to foray into food processing sector in India

German firms are willing to enter the food processing sector in India, but as most of them are in the small and medium sector they need joint venture support from Indian partners, according to Dr. Gerald Thalheim, German Minister of State for Agriculture and Forests.

Speaking at an inter-active session with Indian food sector entrepreneurs at the Associated Chamber of Commerce and Industry of India (Assocham) here on Wednesday evening, he pointed out that the small and medium German food processing companies did not have much capacity to make major foreign direct investments (FDI) in other countries.

But these firms could enter a prospective business tie-up with world class technology, machinery infrastructure and international marketing arrangements, he added.

Dr. Thalheim who is here along with a small German agri-business delegation to take part in an dairy processing exhibition wanted creation of a right environment for foreign tie-ups in food processing. The visit is organised by the Indo-German Chamber of Commerce and Industry.

The German Minister pointed

out that the image in Germany of doing business in India was not a multiplicity of regulations and very bright one because of the complex bureaucratic structure, multiplicity of regulations and varying tax structures in different states. This demanded an improvement on the Indian policy level and flow of right information to German companies on investment opportunities in this country, he added.

Dr. Thalheim said there was great potential for Indo-German partnership in food processing and dairying sector. Germany was European Union's biggest agricultural producer, processor and seller.

Likewise India was the leading producer of grains, fruits, vegetables and milk. But processing and value addition to food produces in India was confined to just about one per cent of the production. About 40 per cent of the production was lost in post harvest handling and storage.

The German minister saw tremendous scope in India for Indo-German joint ventures in small machinery-oriented farm mechanisation, post harvest handling / storage, processing and marketing.

The Pioneer

6.10.2000



Indian milk powder gets discounted quotes

The increase in international

skimmed milk powder (SMP) prices to a five-year-high of \$2,200-2,300 per tonne notwithstanding, not many in the industry expect Indian powder to command prices at these levels.

According to Mr. Deepak Jain, Director, Dynamix Dairy Industries Ltd., the export orders currently being received are for prices typically "in the \$1,850-1,900 per tonne free-on-board range."

The discounted price is mainly on account of quality considerations, with foreign buyers maintaining that Indian SMP contains significant traces of pesticides, transmitted through the grain straw and grass consumed by the cattle here. Sedimentation levels are also considered to be on the higher side, which again has to do with the presence of sand and silica in the grass.

Besides, the bacterial count in Indian milk (which gets reflected, though dead in the powder as well) is relatively high, with even milk handled by the likes of Amul or Dynamix having plate values of 5,000-10,000 per ml.

Though this range is well within the 50,000 per ml stipulated by the American Dairy Products Institute (ADPI) for SMP of extra grade, powders from Australia, New Zealand or European countries have counts of less than even 1,000 per ml.

"This is something beyond the control of our dairies as milk is handled here at ambient temperatures, conducive to bacterial growth. In western countries, the cattle are machine - milked and the milk is also chilled at source, before reaching the dairy for pasteurisation and further processing. Although we have installed bulk coolers in some of the primary village milk procuring centres, especially for meeting our export and high value product (cheese, UHT milk, etc.) requirements, achieving European standards is still not possible in tropical conditions", Mr. Jain added. ADPI further classifies milk powders into high, medium and low heat categories on the basis of the level of whey protein nitrogen left in the powder after the heat treatments encountered during the manufacturing process.

Most importers ask for low heat powder with values exceeding six mg nitrogen per gram, whereas typical values recorded for Indian powders range from 1.7 to 3.5 mg nitrogen per mg, which falls in the medium heat category.

The other major quality drawback concerns the prevalence of foot-and-mouth disease in Indian cattle. "Although the extent of this virus in our animals is exaggerated, the fact that the international market perceives it so cannot be wished away. Also, it

serves as a non-tariff barrier and an alibi for importers to quote lower prices for Indian powder", said Mr. Ravi Shankar, Managing Director, National Cooperative Dairy Federation of India.

The other major disadvantage with Indian SMP is that it is processed from buffalo milk, which is usually blended with the 'normal' cow milk. The markets view buffalo milk to be inferior, even though there is absolutely no scientific evidence to back this perception (There are, in fact, some who feel that the higher "whiteness" of buffalo milk, as against the yellowish tinge in cow milk due to the presence of beta-carotene, can be used as a major selling point in niche foreign markets).

As a result, Indian SMP is in a better position to compete in countries such as Bangladesh, Sri Lanka, West Asia and some South Asian countries, rather than the more quality - conscious European and American markets. But even the neighbouring milk-deficit countries, who may not be all that fastidious about quality, are not willing to pay prices of \$2,200-2,300 per tonne for Indian SMP.

"When inferior SMP from Poland and other East European countries is available at much cheaper rates, why should they pay higher prices. So, we have no option but to quote at \$1,800-1,900 per

tonne f.o.b", Mr. R. S. Sodhi, Assistant General Manager, Gujarat Cooperative Milk Marketing Federation (Amul), said. At the same time, even a price of \$1,800 per tonne may not be all that unattractive, considering that it works out to around Rs. 83 per kg at current exchange rates, which is slightly above the average ruling domestic price of Rs. 75 per kg.

The Business Time 3.10.2000



Indian potatoes don't fit the bill for French fries

Thanks to the growing popularity of French Fries in Indian restaurants and fast food centres, potato imports from the US this year have spiked to 1,300 tonnes from 500 tonnes last year.

The imported varieties are found to be of a better quality and are larger in size compared to the home grown potatoes available in the local markets.

"Indian potatoes don't fit the bill for French fries. The imported potatoes are used to prepare the six-inch french fries because the Indian potatoes are much smaller.

Besides the moisture level in Indian potatoes is around 18 per cent compared to 21 per cent in imported varieties," says nutritionist and food technologist Dr. Vinod Karnik.

However the spokesperson for Mcdonalds, which imports largesized potatoes said, "It does not matter whether the potatoes are Indian or imported as far as they match our quality standards.

It is for our supplying companies to decide the type of potatoes they consign.

Apart from the size of potatoes, the holding time, (the period for which preparations remain crisp and look palatable) for the potato preparations is very important. The imported potatoes have a holding time of 7 minutes while that for the Indian variety is 5 minutes.

Sanjeev Kakkar, managing director, Himalaya International Ltd., the only company to export processed potatoes to the USA said, "The major difference between Indian and US potatoes is the carbohydrate level, which is found to be higher in the imported potatoes" The US climatic conditions favour the growth of largesized potatoes required for french fries, while the Indian baby potatoes exported to USA is seen as an exotic."

The Observer

7.10.2000



Opportunities for New Zealand and India Co-operation

The Trade Commissioner Counsellor (Commercial) of New Zealand in Delhi, Mr. Peter Healy had organised an interaction meet on 'New Zealand Food Processing Technology: Opportunities for New Zealand and India Co-operation' on 18.10.2000 at the Taj Mahal Hotel, New Delhi wherein experts from New Zealand presented various opportunities for collaboration between New Zealand and India in the Food Processing Sector. Mr. Geoff Hollands and Mr. Garry M. Broome gave nice presentations on the scope of collaboration in the food industry. New Zealand which has a small population of 4 million, produces 200 million tonnes of food per annum and its economy largely depends on food processing. They indicated that they can offer fully integrated projects in various fields like Fruit & Vegetables processing, Sea Foods, Dairy Technology, Cold Storages, Integrated Cold Chain facilities for perishable foods, CA (Controlled Atmosphere) facilities, Modern slaughter Houses & Production facilities. Mr. Broome referred to some of the new innovations that his country can offer like Captech technology,

Super critical extraction, Fruits & vegetables processing equipment, Grader of 800 fruits per minute capacity, Dry deskiner for Potatoes, Packaging innovation namely Chilltainer (corrugated boxes laminated with polystyrene), fruit wines, etc. He mentioned that they had established a big processed food complex in Hongkong where they can handle 400 different products.

The New Zealand group has established a liaison with Larsen & Toubro Ltd., in India, who are one of the largest manufacturers of food processing machinery.

The presentations, made with slides were very attractive and interesting. They have suggested many areas for collaboration with them by Indian Entrepreneurs.

Persons interested may please contact Mr. Peter Healy, Trade Commissioner, New Zealand Trade Development Board, New Zealand High Commission, 50-N, Nyay Marg, Chanakyapuri, New Delhi - 110021. Tel : 0091-11-688 3170, Fax 0091-11-687 6554, 688 3165, Direct Line 0091-11-688 3165, Cellphone 0091 98 1110 1770, E-mail: peter.healy@tradenz.govt.nz. <http://www.tradenz.govt.nz>.



INDUSTRY NEWS

Fast to cook, good to eat rice porridge

Maggi continues its recent spew of launches with instant rice porridge in microwaveable 50g/300 ml cups. The porridge can be speedily prepared by pouring hot water into the cup together with the seasoning. After re-closing the cover and a 3-5 minute wait, the porridge is ready for supping.

Two flavours of the Malaysia-made halal product are available. The chicken variety features chicken meat and fat, spices, carrot, spring onion while the vegetarian flavour contains salted cabbage, vegetables, soya sauce, palm fat and white pepper powder. Both varieties also contain sugar, salt, maltodextrin, corn starch, MSG, sodium inosinate and guanylate.

Asia Pacific Food Industry March, 2000



Heritage Foods to enter branded foods segment

Heritage Foods (India) Ltd. engaged in the production and sale of processed milk and milk products, is exploring the possibility of entering into the branded foods segment. The company is currently

thinking about various products in this regard, including vegetable processing and marketing of packaged fresh vegetables.

According to the company's Whole-time Director, Dr. V. Nagaraja Naidu, Heritage is also planning to enter the milk markets of Goa, Pune and Mumbai. It is setting up a 1.5 lakh litres per day milk processing plant in North Karnataka at a cost of Rs. 10 crore to cater to the markets of Hubli, Dharwar, Belgaum and Panaji areas.

Mr. Naidu told *Business Line* that the processing unit would be operational by next year following which the supply of liquid milk to the Mumbai market would be explored. As of now, the company was envisaging to expand its milk distribution network in the existing markets of Hyderabad, Chennai and Bangalore. It is setting up one more milk processing centre in Prakasam district which is expected to be commissioned by this month end.

The Business Line 11.9.2000



T-Series plans to churn out food products

The Rs. 350-crores Super Cassettes Industries plans to launch

colour television and a range of food products by Diwali, as part of its diversification plans, a senior official said. Bhushan Kumar, managing director of the company said they plan to launch a variety of food products like juices, peanuts and biscuits in collaboration with a Swiss company. The company which manufactures T-series brand of audio, video cassettes in addition to televisions will be launching a new 29 inch colour television soon, Kumar, son of the late music mogul Gulshan Kumar, said. Another product coming up is window-type air conditioners with remote control facility, he said. The idea behind this expansion was to further establish itself in the field of consumer durables as well as non durables, he added.

The Business Line 11.9.2000



HLL plans exit from Tasty Bite

Fast-moving consumer goods major Hindustan Leve (HLL) is planning to sever its ties with Tasty Bite Eatables, which it controlled once, by selling the balance stake it holds in it.

Sources close to HLL said that

it would soon sell off the stake. HLL holds 1 per cent, 59,530 nonconvert-ible preference shares of Rs. 100 each, worth Rs. 12.20 crore, in the company. The preference shares are redeemable after 10 years. Tasty Bite Eatables is well known for its range of ready-to-serve entrees and has a wide product portfolio.

HLL acquired Tasty Bite along with Kwaliti Ice-cream in 1996. But under HLL control, the company incurred losses and was later declared a sick unit.

It was subsequently referred to the BIFR. In 1998, Tasty Bite was taken over by Preferred Brands International, a US-based company owned by three non-resident Indians. Post-acquisition, Tasty Bite improved and its turnover rose to Rs. 9.02 crore in March against Rs. 5.47 crore in March 31, 1999.

The Business Line 12.9.2000



Singaporean food major enters India

In a bid to cash in on the growing demand for instant food products and beverages in the country, Singaporean multinational Super Coffeemix Manufacturing Ltd., on Monday launched its wide range including 3 -in-1 cereals and coffee mix in the north Indian market. The instant cereals -a mixture of flake cereals, non-diary creamer and sugar require only cold or hot water for preparation and consumption, according to Dilip Tawdey, marketing director of Four

Seasons Marketing Pvt. Ltd, distributors for the 'Super range of products in association with the Mumbai based Ameya Trading Co. Pvt. Ltd.

The Business Line 14.9.2000



California : Agraz to set up a tomato powder plant

The Spanish food group Agraz confirms that it will set up a new tomato powder processing plant in San Joaquin Valley.

By carrying out this long talked-about project, the group will be able to bypass the heavy custom duties which could hit tomato products, such as tomato paste and powder, again in the near future, and also to adapt its processing structure to fulfil US industry requirements regarding the supplying reliability and independence.

This factory will produce powder of Filtermat, from bought-in locally produced tomato paste, specifically for the US market, notably for the production of snacks.

Tomato News Sept...2000



DEL Monte tests electronic pasteurisation

Del Monte has entered into an agreement with Titan Corporation for carrying out tests on Titan's SureBeam^R electronic pasteurisation technology, on various foods packaged in glass and plastic. Similar

to a microwave oven, the system uses ordinary electric energy to instantly eliminate harmful bacteria without changing the taste or the texture of the foods. The method allows products to be fully and naturally ripened before it is processed, so that it heightens freshness characteristics and enhances quality and shelf life.

Tomato News

Sept...2000



Lycopene produced through genetic engineering

Sandmann and collaborators, researchers of Goethe University in Frankfurt (Germany) report on their success with genetically manipulating the bacteria *E.coli* to produce a more potent version of lycopene, an antioxidant believed to help ward off certain cancers. Although researchers agreed on lycopene efficiency and the absorption by the body and the risk of competing with other antioxidants when overloading raise some questions. It is unclear whether the credit of the reduction of cancer risk or heart disease must be linked with a particular molecule when this can be considered as a marker for high intake of fruit and vegetables.

Shouldn't we instead promote a higher consumption of these latter, and above all tomato products, the major source of lycopene but also of other antioxidants?

Tomato News

Sept...2000



Mahaan Proteins Ltd.

Mahaan Proteins Ltd processes over 800,000 litres of fresh milk into various dairy products at its modern processing plants located in northern India. The plants adopt the latest processing technologies from Westfalia Separators, GEA, Alfa Laval, etc.

Products include casein, caseinates, whey protein concentrates, demineralised whey powders, milk protein concentrates, milk mineral concentrates, skimmed milk powder, full cream milk powder, fat filled powder, coffee creamers, customised blends, skimmed milk preparations, milk replacers and butter ghee. These are supplied to food and pharmaceutical companies in the US, Germany, France, the Netherlands, Hungary, Canada, Japan, Korea and many other countries.

Asia Pacific Food Industry March 2000



NutraSweet Company

NutraSweet Company is synonymous with the manufacture of aspartame. Since its introduction in 1981, millions have enjoyed more than 6,000 drink and food products containing NutraSweet.

Aspartame is made of two amino acids, L-aspartic acid and L-phenylalanine, which produce a sweet taste approximately 200 times sweeter than sugar when linked together. NutraSweet contributes

negligible calories as only as small amount is needed to sweeten products.

Besides enhancing the flavour, manufacturers also use this for sugar substitution, bringing saving to total ingredient costs.

Asia Pacific Food Industry March 2000



High-barrier PETs from Tetra Pak

Two new-barrier PET packaging solutions - Glaskin™ and Sealica™ - are to be launched commercially by Tetra Pak in first quarter of 2000. Together, they offer brewers a complete range of gas barrier solutions tailored to specific needs in barrier performance, bottle versus preform supply, package volume demand and capital investment.

Both technologies have undergone customer trials and extended shelf-life tests with beverage companies and brewers in Europe and the US for over a year, with results that have met or exceeded customer performance requirements, according to Tetra Pak. They are also expected to be fully compatible with existing recycling system, having completed internal evaluations and laboratory assessments.

Glaskin™ is a proprietary technology which coats the inner layer of blown PET bottles with a crystal-clear, glass-like, extremely thin layer of silicon oxide providing superior gas-barrier characteristics

and flavour retention performance. Customer shelf-life tests have yielded excellent oxygen and carbon dioxide barrier properties as well as excellent flavour and quality preservation for packaged beer and juice. Depending on the product and location, shelf lives of four to 12 months have been achieved.

Because the coating is inside the bottle, there is no risk of damage to the barrier during transport and storage, allowing maximum shelf-life potential to be attained. The coating's inertness with food also dramatically reduces scalping and flavour absorption. Environmental studies of the coating have led Tetra Pak to the conclusion that the silicon oxide layer will allow bottle recovery through existing PET recycling channels.

The technology comprises several proprietary processes, materials and designs to produce consistently uniform PET bottles in sizes from 0.2 to 2 litres with coating speeds of between 6,000 and 18,000 bottles per hour. An existing vacuum deposition process is used to coat the bottles with silicon oxide, but Tetra Pak says the uniqueness of Glaskin™ lies in its newly developed technologies which enable it to deliver previously unattainable barrier performance levels.

Using a patented injection overlay process to injection-mould a high barrier polymer layer onto PET preforms, Sealica™ employs as a barrier material a thermoplastic epoxy resin called BLOX™.

Sealica™ refers to PET preforms that feature a single over-injected barrier layer which can be adjusted in thickness to furnish different barrier potentials to suit individual produce requirements. Users pay only for as much barrier as they need. Sealica™ is the result of a strategic alliance between Tetra Pak and The Dow Chemical Company, which developed an inject-over inject grade of BLOX and supplies it to Tetra Pak under a worldwide arrangement for the use of the technique in liquid food applications.

The technology uses specialised equipment and processes to first injection-mould a PET preform and then on the same platen, over-inject a single layer of BLOX. A key advantage of Sealica™ stems from its addition of the barrier material at the preform stage. This gives producers the flexibility to purchase small quantities of preforms without long term commitment; use high-barrier preforms in existing stretch blow moulding machines; change the thickness of the barrier material to optimise package performance/cost balance; and minimise investment.

End-user trials have also shown that the new barrier resists delamination. Existing recycling streams can also accommodate Sealica™ and the BLOX layer can be removed and reused in a variety of other applications, including loose fill packaging foams, tie layers and polymer additives.

Asia Pacific Food Industry March 2000



Britannia unveils brand rebuilding exercise

Britannia Industries, which is evolving itself into a premier food company, has rearranged regional biscuit brands and has plans to introduce a slew of products in the biscuits, cakes and dairy segment.

"Our survey shows that we are no longer perceived as a just a biscuit company, but a premier food company," company officials said. Britannia has rearranged some of its regional biscuit brands into clusters based on common consumer segments.

This exercise enabled Britannia to offer a more balanced buffet of products and prices to consumers in the premium, medium and mass market segments, the officials added.

In a bid to meet the consumer needs, the company has recently launched Good Morning biscuits and Vita MarieGold in the medium and Tiger Protein in the mass segment.

In its year of launch, Tiger achieved a turnover of over Rs. 100 crore in the mass market segment and contributed a substantial proportion to its overall business.

Pursuing its vision of making "Every third Indian a Britannia consumer" and envisaging growth plans encompassing a strong presence in the mass market and entry into the dairy segment, it

entered the mass market through its Tiger range of products and dairy through cheese, butter, dairy whitener and flavoured milk.

Prior to 1997, Britannia was perceived as a bakery products company. "Thereafter, we launched a re-engineering exercise to make the brand more contemporary, robust and youthful," the officials said.

Milkman, the umbrella brand name for the dairy portfolio, was launched only six months ago. The dairy range has shown significant growth over the past three years, the officials pointed out. But the repositioning of the company as food company was carried out through a brand building exercise, which was initiated in 1997.

Within a short span of time, the cheese business garnered 35 per cent market share. Other dairy products like ghee, butter, dairy whitener and milk beverage recorded satisfactory growth, the officer said. The key driving force is cost reduction and serving consumer needs better, the officials said.

The Business Standard 29.8.2000



Tasty Bite eyes larger chunk of overseas market

Tasty Bite Eatables Ltd, a Pune based food processing company is expected to end the current fiscal with a turnover of Rs. 9 crores.

The company, which has a

presence in the overseas market for its ready-to-serve food products, is targeting sales from both its Indian and overseas market of Rs. 100 crores by March 2003.

The company is planning to extend its products to 32 cities in the next 12 months. Tasty Bite is available in 28 States in the US and in Pune, Mumbai, Bangalore, Chennai and Hyderabad.

The brand is being introduced in six countries by March 2001.

Tasty Bite is also increasing its product range to introduce international cuisine and regional category products, Mr. Ravi Nigam, President of the company, said.

Strengthening its position in the domestic market, the company is looking to gain substantially from institutional sales.

Currently, 75 per cent of the company's sales of its ready-to-serve food products head to the US. The company is into ready-to-serve products head to the US. The company is into ready-to-serve food products, frozen vegetables, lease of cold storage facilities and food services business.

Tasty Bite Eatables was under the purview of Board of Industrial and Financial Reconstruction (BIFR) as its networth had turned negative. After the company reported a net profit of Rs. 62,83 lakhs on a turnover of Rs. 547.11 lakhs in fiscal 1998-99, it came out of BIFR purview.

The Business Line 1.9.2000



Amul set to expand presence in Gulf

Amul which has carved a niche for itself in the Gulf markets, will expand its presence in the region with the launch of three more specialised items within a fortnight.

Plans are under way to launch Nutramul as well as Amul Condensed Milk and Amulya Dairy Whitener in the UAE market shortly and subsequently in other markets in the region, Mr. Debasis Dhal, Country Manager (Middle East), Gujarat Co-operative Milk Marketing Federation, told *Business Line* in an interview.

The federation established a liaison and coordination office at the Jebel Ali Free Zone (JAFZ) in 1997 and has made a successful foray into the frozen dairy segment since then, with 20 to 25 per cent growth over the past three years, Mr. Dhal said.

Amul Ghee has been in the Gulf market for the past two decades and the demand for this product has been steady over the years, he said. An average of two containerloads of ghee is transported to the UAE monthly with sales of around \$1.2 millions per annum.

"We launched Amul butter a couple of years ago, followed by cheese, *srikhand* and *paneer*. We currently have a seven to eight per cent market share for our frozen dairy items and are looking to expand our presence as the prospects look good in the region," he said.

With the federation's strategy focused on need products that primarily cater to the large Indian expatriate population in the Gulf states, the launch of three new products is aimed at exploring new avenues where market potential appears promising, Mr. Dhal said.

There is short supply of processed dairy products in the region as there are no large scale manufacturers. "Since milk output in India has also increased in the past five to seven years, we are seriously looking at expanding our overseas market," he said.

The Middle East is now the largest overseas market for Amul products followed by the US and to a lesser extent, Australia, New Zealand and Africa. In this region the UAE is the biggest buyer of Amul products, followed by Kuwait, Oman Bahrain and Qatar. The federation entered the Saudi Arabian market only a couple of months ago with the launch of Amul Ghee, he said.

The federation operates through agents in the Gulf States which directly import the products while the JAFZ office restricts itself to liaising and problem solving, he said. With the launch of more products and possible increase in volumes, the federation may consider setting up a warehousing facility at JAFZ to facilitate storage.

The Business Line 1.9.2000



Lay's eyes bigger share of market

Frito lays *maange* more. That's the *mantra* at Pepsi subsidiary Frito Lay, makers of Lays chips and Lehar namkeen. The snack foods company has outlined a major expansion programme. Besides adding on capacity with a new plant, it is strengthening its supply chain with increased contract farming and distribution, in a bid to gain more market share.

The company is investing Rs. 25 crore to set up a potato chip factory in Pune this week. This is the second plant for Frito Lay after the one in Punjab. The Punjab factory will cater to the northern and eastern regions and the Pune factory will cater to the west and south. The company intends to set up two more factories in the south and east soon. According to a PepsiCo spokesperson: "Once local manufacturing bases are set up, it can then lead to a reduction in various costs including freight costs." All this while, Frito Lays' Punjab factory catered to demand of all other regions. Now, the additional 3,000 tonnes per annum from the Pune plant together with the 6,000 tonnes per annum from the Punjab plant is expected to help PepsiCo make a mark in the Indian snack foods market. Analysts believe that this move could affect players like the Delhi based Uncle Chipps, whose strength has been in

launching various ethnic flavours like Spicy Treat, Tomato Punch, Papri Chat and Pudina Phataka.

Lays, which is in the Premium segment at Rs. 15 for 50 gm, has also launched similar flavours, as well as the American style cream and onion flavour. Say company officials: "This has helped us in widening our consumer base."

Multinational Procter & Gamble has also been importing and marketing Pringles in India which is considered super premium. Apart from strengthening its supply chain, Frito Lay is also looking at beefing up its distribution network. Said company spokesperson: "The volume growth is around 30 per cent per annum and brand share in potato chips market is 65 per cent."

Frito Lay has also undertaken a contract farming programme whereby farmers will produce low sugar, high solids potatoes. In 1995, Frito Lay could meet 15-20 per cent of its requirement through contract farming while the remaining was purchased from the market. The company now has ambitious plans to complete the desired requirement of potatoes (40,000 tonnes) by year 2004. Says a company spokesperson: "We are strengthening our backward linkages with farmers which will help bring uniformity and healthy potato chips into the Indian

market." When Lays hit the market in 1991 as Ruffles, the branded chips market was almost non-existent and consumers weren't interested in paying a premium for a brand. Lays also had to cope with name changes - from Ruffles to Ruffles Lays in 1997, and finally Lays in 1998. Today it has Lays Chips, Cheetos cheese puffs and the Lehar Namkeen range. The Indian snack food market is estimated at Rs. 2,000 crore, of which the organised market is about Rs. 300 crore. Frito Lay is expected to close at Rs. 150 crore for the year 2001, said a company spokesperson.

The Economic Times 8.9.2000



HPMC signs MoU with Wockhardt

The Himachal Pradesh Horticultural Produce Marketing and Processing Corporation Limited (HPMC) today signed a memorandum of understanding with a multinational company, Wockhardt, Mumbai, for marketing of its products including jams, tomato ketchup, juices and pickles etc.

Presiding over the meeting of the Board of directors of HPMC, Mr Narinder Bragta, Minister of State (Horticulture) and Chairman, HPMC, said that Wockhardt has a milk processing plant at Ambala in

Haryana. To start with, Wockhardt would market HPMC products in bulk in the 9 selected prominent towns of Northern India i.e. Chandigarh, Jalandhar, Mandi, Udaipur, Jaipur, Kanpur, Lucknow, Bareilly, Hardwar etc.

The Tribune

16.9.2000



Truly Delicious

Milk-Based jam and packed desserts? yes that is what the two-year-old Dabon International is offering under the Le Bon brand name.

Dabon International, a joint venture (JV), between the French dairy major Bongrain and Dabur India Ltd is expanding its focus into dairy products. The estimated size of the organized dairy products market is 6,500 tonnes and is valued at close to Rs. 2,500 crore.

With well-known, heavyweight, brands such as Amul and Britannia in the fray, Le Bon has a tough task ahead, but P. K. Gupta, chief executive officer, Dabon International says, "There is enough room in the market, for all the players and it can be seen from our market share of 12 per cent in the cheese segment in just two years".

What the company is offering is a milk-based bread spread which guarantees that it will not harm the

health of the child (they are targeting the product at). In the offing is also a dessert, appropriately named Delicia, that will see many Indian delicacies available in the package form.

The jam spread which comes in two flavours, toffee and chocolate, is something one could (especially, kids) look forward to, especially because it is a new product category in the market. "The Indian palate is one factor that we, as a company, extensively researched before introducing these products and our initial tests confirm the acceptance of both these products," explains Gupta.

Delicia, which is currently available in two flavours, Elaichi and Mango, is a variant of *Shreekhand* a popular sweet dish in the western part of the country, and Gupta has plans to get more such regional delicacies out for the consumer. In an industry that is dependent on cold storage and distribution, the company is trying to get the logistics in place before expanding further. At present, the 2,500 tonnes capacity that the company has, is underutilized and it is one of the reasons why Dabon is looking at other businesses.

"Currently we are using the resources at Noida but, I do not rule out the possibility of another plant at a later date," adds Gupta. Dabon, in the meantime plans to

flood the market with variants to what it did in the cheese market and establish itself as a major dairy player.

The jam spread is available in a pack size of 170 gm for Rs 30 while Delicia is available in two pack-sizes of 100gm for Rs 10 and 400 gm for Rs. 35. The company is also planning to get into a massive promotion for both the products using the schools channel. HTA is the advertising agency handling the Le Bon account.

Dabon hopes to have a sizeable share of the revenue coming from these products. "We have plans to introduce many products under the Delicia brand and I am sure it will be popular, especially since there are very few organized players in the sweet dish market in India," adds Gupta. That is a sweet thought for the company.



Intl Flavors grasps Bush Boake Allen

International Flavors & Fragrances Inc, the No. 1 fragrance maker in the world, said on Monday that it would purchase flavours and fragrances maker Bush Boake Allen Inc for \$48-1/2 per outstanding share, or \$970 million, which will help International Flavours take aim at being the world's No. 1 flavour-maker.

International Flavors' offer, which was approved by the boards of both companies, represents an 11 per cent premium on Bush Boake Allen shares, based on the current stock price. The deal is worth \$970 million based on 19.9 million shares outstanding.

International Flavours, which on Monday warned of lower earnings per share estimates for the third quarter and for 2000, will benefit by the flavour production strength of Bush Boake Allen, said an International Flavours spokeswoman. International Flavors fragrances unit is currently stronger than its flavours division.

The combined company will have 6,600 employees and 120 locations in 48 countries. International Flavours said it expects to begin a tender offer for the 19.9 million shares no later than October 10.

International Flavors said the deal will be cash accretive in 2001 and earnings per share accretive in 2002, before a raised share repurchase programme the company announced Monday.

International Paper Co. which currently owns 68 per cent of the shares, has agreed to tender the shares for the acquisition. The deal is still subject to shareholder approval.

Bush Boake Allen said on June 20 it would retain Credit Suisse

First Boston to explore strategic alternatives to increase shareholder value, including the possible sale of the company.

Irish food ingredients company Kerry Group Plc said on August 30 it was among several companies in initial negotiations to purchase Bush Boake Allen.

The Business Line 27.9.2000



JPFL negotiating with Indian arm of MNC

Jain Processed Foods Ltd (JPFL), a subsidiary company of Jain Irrigation Systems Ltd. (JISL), is negotiating with an Indian arm of a multinational company for producing new products and improving capacity utilisation at its plant located at village Shirsoli in district Jalgaon. The company official declined to give other details but said that the negotiations were at the final stage and the management would announce the full details shortly. JISL is holding nearly 92 per cent of the equity capital of JPFL. After receiving a jolt in its financial performance, JPFL has approached International Agricultural Finance Specialist Bank for crystallising options available for restructuring and strategy to be adopted for the improvement in working of food processing plant.

JPFL is engaged in the producing

fruit puree and concentrate. The plant has an installed capacity of 27,400 MT per annum. Production of banana puree, mango puree, papaya puree, and guava puree and their concentrate reached 3,000 MT as against 2,622 MT in the previous year. Based on trial runs of guava products last year the company has been able to sell most of the products produced. Banana continues to be the steady product line whereas sufficient availability of the finished goods has led to improved sales realisation from mango. The company suffered a heavy setback in operations during the nine months period ended March 2000 on account of lower capacity utilisation which stood at only 11 per cent and lower international price on account of over supply position.

Though JPFL's sales increased to Rs 7.22 crore during the nine months period from Rs 3.17 crore in the 15 months period of the preceding year, the company incurred a loss of Rs 1.38 crore and its accumulated loss increased to Rs 8.21 crore.

The Observer 02.10.2000



Hind Lever open offer for Intl Bestfoods at Rs 173

Hindustan Lever has filed a proposal with the Securities &

Exchange Board of India, making an open offer to the minority shareholders of International Bestfoods, the Indian subsidiary of the US major which is being acquired by HLL's British parent, Unilever.

International Bestfoods Inc holds 76 per cent of the Indian arm's equity. This will get automatically transferred to Unilever. In keeping with the takeover code, HLL is required to make an open offer for the remaining 24 per cent held by small shareholders.

The offer price has been set at Rs 173 a share, and would result in

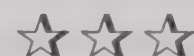
an outgo of Rs 14.28 crore for HLL. Sitting on cash reserves of Rs 1,883 crore and an investment portfolio of Rs 1,006 crore, analysts do not see the acquisition as having any major impact on the finances of HLL. DSP Merrill Lynch has been appointed the lead manager to the offer.

Indeed, the acquisition will only strengthen HLL's foods business. The Bestfood brands available in India are Captain Cook (salt and atta), Knorr soups and chinese mixes, Brown and Polson custard powder, cake mixes, cornflour, orange drink powder, Tarla Dalal-mixes, Rex jelly and

baking powder and Skippy soft drinks and jelly bites.

Bestfoods has a turnover of Rs 100 crore in India and is a leader in many of its brands. It is the market leader in soups, starches and desserts. HLL, on the other hand has targeted foods as a major business focus owing to a slowdown in the mainline detergents and personal products business. It aims to double its turnover from foods to Rs 4,000 crore in another three years, the company had earlier said.

The Business Standard 12.10.2000



APEDA NEWS

APEDA have informed that M/s. Thangam Exports would be interested in liaising with interested parties in developing exports.

They may be contacted for further details at :

Mrs. Kumaran
M/s Thangam Exports
B-3/2, Safdarjung Enclave
New Delhi - 110029
Tel : 91-11-6197646, 6195142
Fax : 91-11-6193719



GOVT. CIRCULARS

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi. the 13th September. 2000

G.S.R. 716(E). - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by Sub-section (I) of Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), number G.S.R. 418(E), dated the 10th May, 2000 in the Gazette of India, Extraordinary. Part II. Section 3, Sub-section (i) dated the 10th May 2000 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of forty-five days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said Gazette of India were made available to the public on 11th May, 2000;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government:

Now, therefore, in exercise of the powers conferred by Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (5th Amendment) Rules, 2000.
(2) They shall come into force on and from the 30th day of September, 2000.
2. In the Prevention of Food Adulteration Rules, 1955.--
 - i) in rule 42 --

a) for sub-rule (V), the following sub-rule shall be substituted, namely :--

"(V) Every container or package of edible common salt or iodised salt or iron fortified common salt containing permitted anti-caking agents shall bear the following label, namely :--

EDIBLE COMMON SALT OR IODISED SALT OR IRON FORTIFIED

COMMON SALT*

CONTAINS PERMITTED ANTI-CAKING AGENT

*STRIKE OUT WHICHEVER IS NOT APPLICABLE

b) in sub-rule (ZZZ), clause (11) shall be omitted;

ii) rule 44H shall be omitted:

iii) in rule 49, in sub-rule (10), for the words, "Table iodised salt or table iron fortified common salt", the words "Edible Common salt or iodised salt or iron fortified common salt" shall be substituted.

[f.No. P. P-15014/2/2000-PH (Food)]

DEEPAK GUPTA JT. SECY.

Foot Note : -- The prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide S.R.O. 2105 dated 12-9-1955 and were last amended vide No. G.S.R. 537(E), dated 13-6.2000.

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 13th September, 2000

G.S.R. 718 (E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) number GSR 429(E) dated the 11th June 1999 in the Gazette of India, Extraordinary Part II, Section 3, Sub-section (i) dated the 11th June 1999 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of a period of forty-five days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public.

And whereas the copies of the said Gazette of India were made available to the public on 14th June 1999.

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government :

Now therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely :--

RULES

1. 1) These rules may be called the Prevention of Food Adulteration (4th Amendment) Rules 2000.

2) They shall come into force on the date of their publication in the Official Gazette except rule 21(c) which shall come into force after six months from the date of their publication.

2. In the Prevention of Food Adulteration Rules 1955--

a) in rule 29 --

i) clause (g) shall be omitted:

ii) the following clause shall be inserted at the end, namely :--

"(h) Flavour emulsion and flavour paste for use in carbonated or non-carbonated beverages only under label declaration as provided in clause (13) of sub-rule (ZZZ) of rule 42":

b) in rule 42, of the sub-rule (ZZZ) (12), the following shall be inserted, namely :--

"(ZZZ) (13) Every container or package of flavour emulsion and flavour paste meant for use in carbonated or non-carbonated beverages shall carry the following declaration in addition to the instructions for dilution,
namely :

FLAVOUR EMULSION AND FLAVOUR PASTE

FOR USE IN CARBONATED OR NON-CARBONATED BEVERAGES ONLY".

c) in rule 57, in sub-rule (2), in the Table--

i) against serial No. 2 in column 2, after item (ii-a)

the following items and entries shall be inserted, namely :

(2)	(3)
"(ii-b) Juice of orange, grape, apple, tomato, pineapple and lemon	5.0
Pulp and pulp product of any fruit	5.0
(ii-c) Infant milk substitute and Infant foods	15.00
	(But not less than 2.8)"

ii) against serial No. 3 in column 2, after item (ii-b) and the entries relating thereto, following shall be inserted, namely :--

(2)	(3)
"(ii-c) Juice or orange, grape, apple, tomato, pineapple and lemon	0.2
Pulp and pulp products of any fruit	0.2"

iii) against serial No. 4 in column 2, after item (i) and the entries relating thereto, following shall be inserted, namely :-

(2)	(3)
"(i-a) Jam, Jellies and Marmalade	250
Juice of orange, apple, tomato, pineapple and lemon	250
Pulp and pulp products of any fruit	250"

iv) against serial No. 5, in column 2, for item (i) and entries relating thereto, the following shall be substituted, namely :--

(2)	(3)
"(i) Ready-to-drink beverages	5.0
Juice of orange, grape, tomato, pipeapple and lemon	5.0
Pulp and pulp products of any fruit	5.0
(i-a) Infant milk substitute and Infant foods	50.0
	(but not less than 25.0)"

[F.No. P. P-15014/2/2000-PH (Food)]
DEEPAK GUPTA Jt. Secy

Foot Note : -- The prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide S.R.O. 2105 dated 12-9-1955 and were last amended vide No. G.S.R. 537(E), dated 13-6.2000

GOVERNMENT OF INDIA

Ministry of Finance

(Department of Revenue)

New Delhi: September 01, 2000

NOTIFICATION NO.

47/2000 - Central Excise

G.S.R. (E) - In exercise of the powers conferred by sub-section (I) of section 5A of the Central Excise Act, 1944 (1 of 1944) the Central Government, being satisfied that it is necessary in the public interest to do, hereby directs that each of the notifications of the Government of India in the Ministry of Finance (Department of Revenue), specified in the column (2) of the Table hereto annexed shall be amended in the manner specified in column (3) of the said Table.

TABLE

SL.NO. NOTIFICATION NO.
AND DATE

AMENDMENT

8/2000 - Central Excise
dated the 1st March, 2000

In the said notification, -

(i) in the TABLE,

(a) against Sl. No. 1. in column (2)

(1) for the words "fifty lakh rupees", the words "one hundred lakh rupees" shall be substituted, (II) the following proviso shall be inserted at the end namely :

'Provided that if any clearances for home consumption have been made before the 1st day of September, 2000 under this notification during the financial year 2000-2001, whether at nil rate or otherwise, the aggregate value of such clearances shall be taken into account for computing the limit of one hundred lakh rupees".

2. Sl. No. 2 and the entries relating thereto shall be omitted:-
(ii) after the TABLE, the following shall be inserted namely:-
"ILLUSTRATIONS REGARDING SL.NO 1 OF THE TABLE
(in these Illustrations, "Clearances" means clearances for home consumption)

ILLUSTRATION 1. As on the 31st day of August, 2000, a manufacturer has made clearances of an aggregate value forty lakh rupees at nil rate of duty. He shall be entitled to additional duty free clearances upto an aggregate value of sixty lakh rupees, only in the remaining part of the financial year 2000-2001.

ILLUSTRATION 2. As on the 31st day of August, 2000, a manufacture has made clearances of an aggregate value of Sixty lakh rupees, comprising of fifty lakh rupees at nil rate of duty

and ten lakh rupees at the concessional rate of duty at five per cent. He shall be entitled only to additional duty free clearances upto an aggregate value of forty lakh rupees, only, during the remaning part of the financial year 2000-2001.

ILLUSTRATION 3. As on the 31st day of August, 2000, a manufacture has made clearances of an aggregate value of one hundred and ten lakh rupees, comprising of fifty lakh rupees at nil rate of duty, fifty lakh rupees at the concessional rate of duty of five per cent and ten lakh rupees at the normal rate of duty. He shall not be entitled to any additonal clearances at nil rate of duty during the remaining part of the financial year 2000-2001

(iii) in the Explanation, after clause (H), the following clause shall be inserted, namely:-

"(I) refund of duty paid at the concessional rate of five per cent on any clearance made before the 1st day of September 2000 on the ground that such clearances are included in the aggregate value of clearances under Sl. No. 1 of the TABLE, shall not be admissible."

2. 9/2000 Central Excise dated the
1st March, 2000

In the said notification :-

(i) in the TABLE,

1. against Sl. No. 1, in column (2)

(I) for the words "fifty lakh rupees", the words "one hundred lakh rupees" shall be substituted :

(II) the following proviso shall be inserted at the end namely:

"Provided that if any clearances for home consumption have been made before the 1st day of September 2000, whether at nil rate or otherwise, the aggregate value of such clearances shall be taken into account for computing the limit of one hundred lakh rupees."

(b) Sl. No. 2 and the entries relating thereto shall be omitted:

(ii) after the TABLE, the following shall be inserted, namely.

"ILLUSTRATIONS REGARDING SL.NO 1 of the Table (in these Illustrations, "Clearances" means clearances for home consumption.

ILLUSTRATION 1. As on the 31st day of August 2000, a manufacturer made clearances of an aggregate value of sixty lakh rupees, comprising of fifty lakh rupees, at the concessinal rate of sixty per cent of normal duty. He shall be entitled to additional clearances upto an aggregate value of forty lakh rupees, at the concessional rate of sixty per cent of normal duty, during the remaining part of the financial year 200-2001

ILLUSTRATION 2. A manufacturer made clearances of an aggregate value of clearances of thirty lakh rupees at nil rate during the financial year 2000-2001 under notification 8/2000 - Central Excise dated the 1st march 2000. Thereafter he opted for exemption under this notification. As on the 31st day of August, 2000, the manufacturer made clearances of an aggregate value of sixty lakh rupees, comprising of thirty lakh rupees at nil rate of duty, twenty lakh rupees at the concessional rate of sixty per cent of normal duty and ten lakh rupees at the concessional rate of eighty per cent of normal duty. He shall be entitled under this notification to additional clearances upto an aggregate value of forty lakh rupees, at the concessional rate of sixty per cent of normal duty, during the remaining part of the financial year 2000-2001

ILLUSTRATION 3. As on the 31st day of August, 2000, a manufacturer has made clearances of an aggregate value of one hundred and ten lakh rupees, comprising of fifty lakh rupees at the concessional rate of sixty per cent of normal duty, fifty lakh rupees at the concessional rate of eighty per cent of normal duty and ten lakh rupees at the normal rate of duty. He shall not be entitled to any exemption under this notification during the remaining part of the financial year 2000-2001.

(iii) in paragraph 2, Illustrations, I, II, III and IV, shall be omitted.

(iv) in the Explanation after clause (H), the following clause shall be inserted, namely:-

"(I) refund of the difference between any duty paid on clearances made before the 1st day of September, 2000 and the concessional rate of sixty per cent of normal duty on the ground that such clearances are included in the aggregate value of clearances under Sl. No. 1 of the TABLE, shall not be admissible."

(VIVEK JOHRI)

Deputy Secretary of the Government of India



EXPORT OF WHEAT AND WHEAT PRODUCTS -- CEILINGS FOR 2000-2001 ANNOUNCED

new Delhi: September 05, 2000

The Government has decided to fix the quantitative ceiling for export of wheat at 20 lakh metric tonnes (2 million metric tonnes) during the licensing year 2000-2001 and to permit export of wheat products

without any quantitative ceiling. It has been decided to designate the Agriculture & Processed Food Products Export Development Authority (APEDA) for the purpose of issuing Registration-cum-Allocation Certificates (RCACs) for export of wheat and wheat products. A Public Notice (No. 30(RE)-2000/1997-2002) dated 1st September, 2000 to this effect has already been issued by the Directorate General of Foreign Trade (DGFT).

As per the Exim Policy the export of wheat is allowed freely subject to quantitative ceilings announced by the DGFT from time to time and issue of Registration-cum-Allocation Certificates by APEDA. For the year 1999-2000 a ceiling of one million tonnes of wheat and unlimited quantity of wheat products was announced but exports of wheat during 1999-2000 could not be made because of low international prices. In view of requests received for export of wheat and wheat products and the huge stocks of wheat during this year it has been decided to fix the quantitative ceiling of 2 million tonnes of wheat for export during the current financial year 2000-2001. Wheat products have also been permitted to be exported without any ceiling.



Minutes of the 29th Meeting of the Food Additives Sub-Committee of C.C.F.S. held on 19th September 2000 at Nirman Bhavan, New Delhi.

The 29th Meeting of the Food additives Sub-Committee of C.C.F.S. was held on 19.9.2000 under the chairmanship of Dr. V. Prakash, Director, Central Food Technological Research Institute, Mysore. A list of the participants is at Annexure I.

Chairman extended a cordial welcome to the participants. He reiterated his earlier remarks that members of the Sub-committee be nominated by name by the Industry, Consumers and other organisations so that same member attends meeting on regular basis to keep continuity.

Dr. S.R. Gupta, ADG(PFA), extended a cordial welcome to the participants. Thereafter agenda items were taken up for considerations.

Confirmation of the minutes of last meeting :

The comments of C.I.I. & N.I.N. were clarified and thereafter the sub-committee confirmed the minutes of last meeting.

Item No. 1: Action taken report on the minutes of last meetings:

The Sub-committee noted action taken on the recommendations of the last meeting. The following points emerged-

(i) Microcrystalline Cellulose and Ethyl Cellulose -

The Sub-committee considered the proposal for use of Ethyl Cellulose and microcrystalline cellulose in food. The Sub-committee decided that a group of two scientists, one each from CFTRI and DFRL, Mysore may prepare a detailed note giving following specific details:

- a) Food in which to be used
- b) Percentage/level of use
- c) Particle size

- d) Analytical methods for both the celluloses in food items

The group will submit its report to the Chairman by 12.10.2000 who will send it to secretariat.

(ii) Use of blend of Aspartame and Acesulfame-K as table top sweetener -

The Sub-Committee considered the request for allowing the blend of aspartame and accsulfame-K as table top sweeteners. The Sub-committee desired to have the following information from the applicant:

- a) Scientific reasons and technological necessity to market blend of two artificial sweeteners.
- b) What are the synergistic effects of the blend? Any scientific study?
- c) What are the analytical methods to detect these sweeteners in samples and the details of the protocols, including spiking experiments.
- d) DGIIS Secretariat to inform these to applicant for details.

(iii) Limit of lead in infant milk substitutes -

May please see Item No. 8.

(iv) Use of Aluminium lake colour in dry beverages mixes-

The Sub-committee desired to have the following information from the applicant:

- a) Detailed specification of the dye for laying down the same under the PFA Rules.
- b) Aluminium content in these dyes.
- c) Methods for analysis from the food products and the detailed protocols of extractions.
- d) Solubility in water and floating problems of insolubles.
- e) Label details.

(v) Use of artificial sweeteners in foods-

The Sub-Committee considered the proposal for use of artificial sweeteners in various foods. The sub-committee observed that the usage levels of sweeteners proposed is quite high. There is a need to establish the equivalence of sweetness of sugar vis-a-vis of artificial sweeteners. The committee recommended to obtain the following information from the applicants.

- a) Usage levels in food products
- b) Equivalence of sugar in terms of degree of sweetness
- c) What will be the information on the label/complete text of label?
- d) What will be the bulking agents to be used in the product in place of sugar and their calorific value.

Item No. 2: Use of Nisin in Paneer and in traditional Milk Products:

The Sub-committee considered the proposal for use of nisin in Paneer and other traditional milk products. The sub-committee was of the view that if the product is canned and hermetically sealed, there is no need for any preservative including Nisin. However, if a tin container is used for packaging the product and it is not hermetically sealed, in that case there is a need to add Nisin. The Sub-committee desired that the applicants may send the following information:-

- a) Define the packaging materials.
- b) Indicate the process details for manufacturing and packaging the products.
- c) The limit of NISIN to be used in each product.
- d) The method of estimation of NISIN in the products.

Item No. 3: Use of isomalt in foods:

The Sub-Committee considered the proposal for use of isomalt in various foods as sweetener, bulking agent, anticaking agent and as glazing agent. The sub-committee observed that the applicant may submit the details of the foods in which they want to use as bulking agent, as sweetener and as anticaking agent or glazing agent and the limits of isomalt proposed to be used in each case. The applicant may also send the detailed label of the products.

Item No. 4: & :Use of artificial sweeteners in bread, biscuits and cakes and other products:

The Sub-committee considered the proposal for use of artificial sweeteners in bread, biscuits and cakes and other products. The sub-committee observed that the method of analysis supplied by the applicant is not valid for productwise because the method given is valid for detecting of pure sweetener but it is not valid to analyse artificial sweetener out of a food product because the method of extraction and cleanup procedures are not adequate.

The sub-committee was of the view that it could be more appropriate if the manufacturer uses a single sweetener in a food rather than a mixture as it will be easy to analyse. The sub-committee desired that the applicant may submit the following information:

- a) Food products (individual food) in which sweetener is proposed to be used.
- b) Level of sweetener to be used and in terms of sugar equivalence.
- c) Methods of analysis with extracting procedure.
- d) Label of the product with full text and colour scheme.
- e) Classification of such food products.

Item No. 6: Use of Inulin and Oligofructose in bread, cakes, biscuits, etc.:

The Sub-committee considered the request for use of inulin and oligofructose in bread, cakes and biscuits as bulking agents. The sub-committee desired that the applicant may submit the following information:

- a) Usage levels of inulin and oligofructose in foods.
- b) Methods of determination in foods.
- c) Interaction of calcium and zinc ions in food systems
- d) Claims of health food, if any.
- e) Label of the product.

Item No. 7: Requirement of minimum sucrose content in artificially sweetened carbonated water:

The Sub-committee considered the proposal of use of sucrose and artificial sweetener in carbonated water and its declaration. The sub-committee agreed with the views that there is no need of minimum percentage of sugar in these products. The sub-committee also agreed with the proposal that there is no need to have two types of products, namely, "sweetened" and "diet" drink separately and there is a need

have only single standard for carbonated water without requiring any minimum limit of sugar.

The quantity of added sugar and calorific value shall be declared on the container and if no sugar is added that also will be declared. This will apply in all the foods wherever artificial sweeteners are added.

Item No. 8: Harmonisation of maximum limits of heavy metals contaminants with Codex:

The Sub-committee considered the proposal for harmonising limits of heavy metals and contaminants with Codex.

The proposal was circulated amongst the members for examination and sending their comments. It was noted that very few members had sent their comments on the document. The members were requested to send their comments on the proposal by 12.10.2000 and thereafter the matter may be considered in the next meeting of the sub-committee.

Item No. 9: Fortification of edible oil with Vitamin 'A'

The addition of vitamin 'A' to edible oil to enhance the nutritional level was discussed in great detail.

The point came up during discussion including stability of vitamin 'A' that needs to be added and even the fundamental basis for adding vitamin 'A' to oil was raised by some members. Upon careful examination of the agenda and the available information from many of the institutions such as N.I.N., Hyderabad, CFTRI, Mysore, and DFRL, Mysore and other institutions, it was observed that no sufficient data is available for immediate recommendation for addition of vitamin 'A' to the oil including the problems of hyper-vitaminosis. Therefore, these have to be worked out in greater detail before any decision is taken in the matter purely on scientific information. As many of the studies take long duration which include bio-availability measurement of vitamin 'A', this will take considerable amount of time and when these studies are completed the sub-committee will be appraised of, at which point an appropriate decision will be arrived at on the issue. In the meantime information will also be sought at international level for a holistic approach of the problem.

Item No. 10: Use of Gellan gum in food:

The Sub-committee considered the proposal of use of Gellan Gum in foods. It was noted that the proposal is general in nature and not specific. The sub-committee desired the applicant may send the following details:

- a) Specific request for use of Gellan Gum.
- b) The individual food in which to be used.
- c) The quantity to be used.
- d) The method of determination of Gellan Gum in the product.

Item No. 11: Use of pectin in potato chips

The Sub-committee considered the proposal for use of pectin in potato chips. The sub-committee was of the view that there is no technological necessity for use of pectin in potato chips.

Item No. 12: Caffeine in carbonated water:

The proposal for declaring quantities of added caffeine in carbonated beverages was discussed. The

sub-committee noted that the comments received from the members favour for declaring the quality of added caffeine on the label for information of consumer. Some members favoured the deletion of use of caffeine in carbonated water since it is a habit forming substance. The sub-committee desired that the manufacturers may be informed as to why not delete the use of caffeine from carbonated water and submit technological justification for its use.

Supplementary item: Amendment to Rule 63 of PFA Rules, 1955:

The Sub-committee considered the proposal for amending the provisions of Rule 63 of the PFA Rules, 1955. The sub-committee was unanimous for deletion of following words occurring in Rule 63(A) :-

"Some times animal raw material, either in their natural state or processed".

The Sub-committee considered the views on the use of flavours from sources like Bhang, Dhatura, opium and tobacco. The sub-committee was of the opinion that the words "acceptable for human consumption" occurring in Rule 63(A) are sufficient to deal such unacceptable flavours and the Tea Board which is the licensing authority may apply this principle in considering the application for use of flavour in tea.

There being no other agenda item, the meeting ended with vote of thanks to the Chair.



Basaveshwar Engineering College - Science and Technology Entrepreneurs Park (BEC - STEP)

BEC-Step started its activities at Bagalkot in 1998 to help the local population in fulfilling their aspirations in the areas of Engineering, Science and Technology. Bagalkot district is in the Northern part of Karnataka and has a strong agricultural base with three rivers passing through it. The major crops grown are jowar, wheat, *tur dal*, sugarcane, cotton, groundnut and chillies. Grapes, pomegranate, lemon, sapota are also grown in considerable quantities.

Recently, Government of Karnataka has identified Bagalkot as an Industrial Growth Centre for Agro-based products. The region has a large concentration of handlooms and power looms but requires proper orientation, as the existing techniques have been outdated and customer demands are changing. Bagalkot city is shifted to a newly planned township and rehabilitation centres are coming up for accomodating villagers who were affected by the implementation of Upper Krishna Project.

BEC-STEP has the follwing thrust areas : 1. Food processing; 2. Textile (Power loom and handloom); 3. Low cost building technology. In the Food Processing area, the major activities are : Promotion of entrepreneurship amongst Science & Technology personnel; Establishment of a centre for Technology Transfer; Development of need-based Technology for entrepreneurs; Setting up a data and knowledge based information centre; Setting up of testing and certifying centre; Protecting the region as industrial growth centre in food processing; Establishing rapports with the organisations like CFTRI, Agricultural Universities etc., Transfer/develop processes for value addition for the farmers' produce; Training of manpower in Food Processing and organising symposia / seminars / workshops to motivate entrepreneurial activities.

Dr. M. Mahadevaiah who recently retired from CFTRI, Mysore as Head of the Department of Packaging Technology has assumed office as Director of BEC-STEP. Currently he is also the President of AFST (I) with headquarters at CFTRI campus, Mysore. For further details he may be contacted at :

Dr. M. Mahadevvaiah, Director
Basaveshwar Engineering College - STEP, Bagalkot - 587 102, Karnataka,
Ph : Off (08354) 20504, 3520, Fax : 08354-20504

FAIRS AND SEMINARS

Seminar on Radiation Processing of Food Products, November 2-3, Mumbai, at Multi - purpose Hall, BARC Training School Hostel, Anushaktinagar, Mumbai - 400094.

This seminar is being organized by the Indian National Academy of Engineering (INAE) jointly with the Department of Atomic Energy (DAE) to address different aspects of radiation processing technology for food and agricultural commodities.

Participation in the seminar is by invitation and no registration fee is required.

Interested persons may contact:

Dr. D. R. Bongirwar
Head, FTD & Project Manager, FIP
Bhabha Atomic Research Centre,
Mumabai - 400085.
Tel : 91-22-5505180, 5505050
Extn : 22742, 22539
Res : 91-22-5284003
Fax : 91-22-5505151, 5519613
E-mail : dilip@magnum.barc.ernet.in



Dakar International Trade Fair, Dakar (Senegal), November 23 to December 5, 2000.

India Trade Promotion Organisation (ITPO) is organising India's participation in the above Fair. The fair provides an opportunity to display India's Processed Food Products with a view to developing our exports.

For space and other details, please contact:

Ms. V. Meera
Sr. Manager
India Trade Promotion Organisation
Pragati maidan, New Delhi - 110001
Tel : 91-11-3318143
Fax : 91-11-3318142, 3320855,
3317896
Telx : 031 - 61022, 031-61311
COMXH IN, 031-65155 ADEP IN,
Cable : COMEXM



4th Pride of India Exhibition, 27th February - 2nd March 2001, at Saigon Trade Centre, Ho Chi Minh City, Vietnam.

The above Exhibition is being organised by M/s Comnet Exhibitions Pvt. Ltd., New Delhi with the support of the Embassy of India, Hanoi and the Consulate General of India, Ho Chi Minh City, Vietnam. This event will provide a good opportunity to Indian companies to promote their exports to Vietnam as also to explore the possibilities of investing in joint venture or 100% owned projects in various fields.

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NEW PRODUCTS

On-Line NIR analysers operational in just hours

The MM55plus from NDC Infrared Engineering features a unique, precalibrated, high-precision, optical system for the on-line monitoring of moisture, fat and protein in food products.

The instrument can be installed directly onto the processing line and is operational within hours. It features a wide range of plant interface options including analogue, serial link or fieldbus.

On-line near infrared (NIR) is well established in the food industry. Applications include measurements of moisture, fat and protein in the processing of snack foods, chocolate, coffee, tea, breakfast cereals. Although the technology has a high level of accuracy, traditional instruments required complicated calibration procedures.

The new MM55plus, on the other hand, is simple and easy to maintain and fix up. Sensors are supplied with a factory-set calibration to suit the generic application. They are then adjusted

online to match the appropriate laboratory method.

Improvements over previous systems include a large beam patch size of 40 mm for better averaging on larger particulate materials. A new polymeric segmented mirror, used to collect the reflected NIR, increases the signal to noise ratio by a factor of two, further improving measurement performance.

Up to 80 different recipes can be stored in the control unit and recalled at the touch of a button.

The MM55plus is hygienically designed for use in harsh processing environments. The optical window is made from sapphire rather than traditional glass, eliminating the risk of glass contamination. It also has a polished stainless steel head suitable for use with CIP cleaning. Other options include a Vortec air cooler for the sensor, ensuring reliable operation even near ovens, fryers and dryers.

Asia Pacific Food Industry

March 2000



Microwave / Heatpump Batch Type Dehydration Dryer

The above is a new system developed in Australia to enhance the drying speed and drying homogeneity of food products. In this patented system, microwave has been added to drive core humidity to the surface of the product where the heatpump drying system effectively picks it up. Core dried product has a longer shelf life. The fast but gentle drying process does less damage to the product's flavour, colour and texture. The drying process does less damage to the product's flavour, colour and texture. The drying speed depends on the ability of the product to release humidity but in general, reduction times amount to over 50%. The batch capacity is 200kg of wet load.

Benefits : lower drying temperatures, much faster drying, lower energy levels. Investment around Australian Dollars \$320,000.

For further details : M/s HESTONHILL (S) PTE LTD, Tampines Central PO Box 0170, Singapore 915206, Tel : 0065 7835216, Fax : 0065 7835218, E-mail : Hestonhi@singnet.com.sg may be contacted.

RESEARCH ARTICLES

STORAGE STABILITY OF BRINJAL (*SOLANUM MELONGENA L.*) CHUTNEY IN DEHYDRATED AND READY-TO-EAT MOIST FORMS

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ABSTRACT

Storage stability of brinjal chutney prepared in three forms i.e. dehydrated, intermediate moisture (I.M.) and hurdle technology (HT) based products was investigated. The products were found to have a shelflife of 5-7 months at ambient temperature when packaged in paper-aluminium foil-polyethylene (PFP) pouches. The storage evaluation also includes packaging in metallised polyester and pigmented polypropylene pouches in case of dehydrated product. The products showed rehydration time of zero (instant) to 2 minutes.

INTRODUCTION

Brinjal also known as eggplant is a traditional tropical vegetable and popular in the southern as well as northern parts of India. Several varieties of brinjal were subjected to studies on nutritional composition (Kalra, et al, 1988). It was found that the varieties of brinjal are moderate sources of vitamins and crude fibre with an intrinsic property of free amino acids and chlorogenic acid at significant levels. Brinjal is generally used as a fresh vegetable in several culinary preparations i.e. stuffed vegetable-fried product or as a curried item. However the processed and preserved brinjal products are minimal. Reports exist on dehydrated product (GiridhariLal et.al. 1960), pickles (Nakano su,

1977), processed puree and frozen vegetable (Kalra et. al. 1988) and canned *bartha* (Berry et al. 1988).

The probable reasons for the relative obscurity of shelf stable brinjal products may be its availability throughout the year and processing problems concerning the textural changes during thermal processing due to the lack of suitable varieties. However, with the changing global market scenario, with increasing popularity for Indian culinary delicacies, traditional Indian vegetable items as those of brinjal may get due attention. The ethnic Indian population abroad can also contribute towards the marketing of such traditional foods. The breeding of process-specific brinjal varieties is the need of the hour

along with suitable process protocols to utilise the large quantities of brinjal available within the country and the same needs to be processed in various forms to obtain sufficient shelf stability to reach global export markets.

The present investigation was undertaken to study the storage stability of brinjal chutney, a traditional and popular dish following three conventional technologies for obtaining dehydration, intermediate moisture and hurdle technology based products. These convenience foods are aimed at catering to the requirements of civil as well as Defence sectors due to easy rehydration/ready-to-serve nature and use of appropriate packaging films.

MATERIALS AND METHODS

Raw Material : Brinjal of purple round variety of uniform size and shape were procured from the local market. Six batches of brinjal, each consisting of 20 kg were washed with water. Each brinjal was subjected to a vertical slit of 2 cm length on either side in the middle portion followed by potassium metabisulphite infiltration (0.05%) under vacuumised condition. The brinjals were air dried and coated with refined groundnut oil. They were then roasted at 140°C in a metallic grill till the skin attained a darker tinge on all sides and softened at all portions. The vertical slits made facilitate free movement of vapour during the roasting process. The peels were removed from the roasted brinjal and homogenized to obtain a paste for chutney preparation.

Preparation of Chutney: Hydrogenated fat (550g) was taken in a large stainless steel vessel which was heated to melt the fat followed by addition of onion powder (131 g), mustard seeds (20g), red chilli powder (35 g) spice powder (12 g) cumin seeds (3 g), black pepper (2 g), dried coriander leaves (2 g), coriander seeds (3 g), cinnamon (1 g), cloves (1 g) and raw mango powder (60 g).

After frying the onion and spice mix to a light brown colour the brinjal paste (11.3 kg) was added and cooked for 5 minutes under a low flame followed by the addition of tomato puree (150 g) and further cooked for 5 minutes. Subsequently cooling and sulphitation to an extent of 0.05

to 0.1 % (as potassium metabisulphite) were carried out and subjected to dehydration, intermediate moisture attainment as well as application of hurdle technique.

Dehydration: 20 kg of the prepared chutney was sulphited to the tune of 0.1% in terms of potassium metabisulphite and loaded in aluminium trays at 1.5 kg/tray and dehydrated in a cross flow cabinet air drier at temperature of 60°C. The dehydration was continued till the product reached a moisture level of 6%, The chutney flakes were then subjected to size reduction and packed in polyethylene aluminium foil laminated (0.2 mm foil thickness) metallised polyester 15 gauge and pigmented polypropylene pouches (25 gauge) and subjected to storage at 37°C and ambient conditions.

Intermediate Moisture product : 20 kg of the prepared chutney was sulphited to an extent of 0.07 % in terms of KMS and sodium benzoate was added at the level of 0.1% followed by partial drying in the cabinet drier at the specific conditions to a moisture level of 57% (Jayaraman et al 1975). The intermediate moisture product was then packed in PFP pouches as 100g units for storage evaluation under 37°C and ambient conditions.

Hurdle Technology product: The hurdle process was carried out by means of a combination of pH, dewatering and inpack pasteurisation. The prepared chutney was sulphited to an extent of 0.05% in terms of potassium metabisulphite

and the pH of 4.3 was ensured by the composition of the chutney.

The dewatering process was carried out in the cabinet drier to obtain the product with a moisture level of 79%. The inpack pasteurization of the product was carried out in polypropylene pouches for 20 minutes at 80°C for the 50g packets.

Analytical Methods: The methods for the physico-chemical evaluation of the products were as follows :

Non-enzymatic browning, moisture, protein, fat, crude fibre, peroxide and malonaldehyde: (AOAC, 1980) Total carbohydrates: subtraction method from the composition in terms of protein, fat, total ash and moisture Water activity: modified graphical interpolation method (Jayaraman et al 1977). Sulphur-dioxide: Pearson (1973). pH: by using pH meter (Toshniwal model CL 54). Reflectance: measurement was carried out by diffused light reflectance (Elico make).

Statistical Analysis : Analysis of variance was made according to the method described by Michael Mehong (1986) by means of six experimental determinations of each value. The comparisons were drawn using the Duncan Multiple range test with a statistical computer software.

Sensory evaluation: The dehydrated chutney was subjected to sensory evaluation after reconstitution by a taste panel consisting of ten judges. The opinion of the panel was recorded on a nine point hedonic scale.

RESULTS AND DISCUSSION

Proximate Composition and Water activity: The water activity of the three products was founded to be 0.24, 0.86 and 0.94 respectively which illustrate the nature of the products contributing to the intrinsically built stability. These a_w values were attained at the moisture levels of 6.3, 56.9 and 78.7 respectively (Table 1) for the dehydrated, intermediate moisture and hurdle technology based products. The proximate composition of the products show their resourcefulness in carbohydrates as well as in the crude fibre content besides being a culinary delicacy with a traditional flavour.

Dehydration: The dehydrated product of brinjal was investigated earlier. Giridhar Lal et al. (1966) proposed a method for the dehydration of brinjal in which thick slices of the vegetable were sulphited by a soak in potassium metabisulphite at 0.5% SO_2 level for 90 minutes, blanched and dried at 50-55°C for 9-11 hours. The method is suitable for dried brinjal slices only and therefore vacuum infiltration of SO_2 (0.05% in terms of KMS) helped to sulphite the brinjal tissue to restrict the enzymatic browning. The browning tendency of brinjal is one of the major problems in its processing. The round varieties were reported to possess higher activities of polyphenol oxidase (Knapp 1965). The ingredients contributing towards non-enzymatic browning are the free amino acids and tannic acid. In addition significant

lipoxigenase activity (Pinsky et al. 1971) causes off-flavour development due to oxidative deterioration. In the present study (Table 2), the browning tendency was restricted due to the SO_2 infiltration/addition prior to roasting as well as during the dehydration process. The reflectance values also indicate the same trend with an increasing tendency in browning during storage. However in view of the moisture content of the product the browning was restricted compared to the moist products which can be attributed to the lower water activity and higher SO_2 compared to the moist products (William, 1976).

Intermediate moisture (IM) and hurdle technology (HT) products: The stabilised moist products by I.M. and H.T. technologies showed significant differences in their composition (Table 1). The browning tendency as indicated by the light absorbance of alcoholic extracts and the reflectance of light by the product and lipid oxidation by the peroxide and melonaldehyde values (Table 3 and 4) show a marked increase for the I.M. product over the H.T. product. This can be attributed to the solids contents, 43.1% for I.M. and 21.3% in case of H.T. products in addition to the specific water activities of the products. These observations are in accordance with reports of earlier workers (Labuza, 1975). The increased browning and lipid oxidation rates in the I.M. products can be due to restricted mobility as well as the concentrated browning principles (Eicher, 1975). The restricted

browning and lipid oxidation levels could render higher shelf stability to the H.T. product compared to the I.M. product.

Another important feature of the H.T. product is the absence of antimicrobial compounds unlike the I.M. products which contain potassium sorbate. The preservative mechanism of H.T. product is due to the synergistic effect of combination treatments inclusive of restricted water activity (<0.95); lower pH (<4.5) and the inpack pasteurization applied (Alzamora, 1995). Usually acidic products are preferred for the application of the hurdle technique due to the inbuilt activity which does not alter the taste profile of the product.

Chutney yield, shelf life and sensory quality: The brinjal chutney gave a yield of 52.5% based on raw brinjal. Bhupinder and Harvinder (1992) reported a higher yield using steamed brinjal. However in view of better sensory acceptability of roasted brinjal chutney in terms of consistency and flavour the same was used in the present study. The shelf life of the three products i.e. dehydrated, IM and HT products packaged in PFP pouches were found to be 6, 5 and 7 months under ambient temperature (19-32°C) and 4, 3 and 6 months at 37°C respectively. The dehydrated product showed higher shelf life compared to ones in metallised polyester and pigmented polypropylene pouches.

As regards the reconstitution profiles are concerned, the dehydrated product showed a rehydration time of 2 minutes

whereas the IM and HT products are ready-to-eat by nature and can be served instantly with warming. All the three products are likely to attract marketing as a popular traditional food wherein all the cumbersome kitchen operations are reduced to the minimum besides offering good shelf stability and sensory quality. As such, the products are suitable for small scale/cottage industries.

ACKNOWLEDGEMENT

The authors express their sincere gratitude to Dr. S. S. Arya, Director, DFRL, Mysore for providing the laboratory facilities and constant encouragement throughout the period of study. Thanks are also due to Sri D. K. Das Gupta, Project Coordinator, Fruits and Vegetables Technology Division for timely suggestions and to Sri. T. S. Srinivasan, DFRL, for the help rendered in statistical analysis.

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Table 1. Proximate Composition of Processed Brinjal Chutney

Parameter	Dehydrated Chutney	Intermediate Moisture Chutney	Hurdle Technology based Chutney	S.E
Moisture (%)	6.3±0.8	56.9±1.3	78.7±1.9	1.96
Protein (%)	7.64±0.51	3.91±0.69	1.55±0.18	0.25
Fat (%)	22.9±1.1	10.4±0.8	6.1±0.6	0.64
Total Ash (%)	2.28±0.76	1.04±0.15	0.54±0.11	0.004
Crude Fibre (%)	3.48±0.12	1.12±0.08	0.57±0.07	0.01
Total Carbohydrates (%)	57.44±1.4	26.72±1.2	12.54±1.1	0.61

All the parameters of all the three products are significantly different at P<0.05.

Table 2. Data on storage stability of dehydrated brinjal chutney packaged in flexible pouches at RT (19-33°C) and 37°C

Packaging material & Periods in months	Browning (O.D.)		Reflectance (%)		Peroxide Value (mil.equi. O ₂)/Kg	Malonaldehyde (mg/Kg)		Sensory Score (1-9 hedonic scale)	
	RT	37°C	RT	37°C		RT	37°C	RT	37°C
Pigmented Polypropylene									
0		0.21±0.03		24.1±1.3	16.8±1.6		0.18±0.02		7.8±0.23
2	0.31±0.02	0.35±0.01	22.2±0.8	20.3±1.1	22.7±1.24	28.5±1.1	0.34±0.08	0.39±0.05	7.1±0.24 6.8±0.28
4	0.39±0.03	0.47±0.02	13.8±0.7	12.1±1.2	33.5±1.56	39.6±1.7	0.51±0.04	0.55±0.03	6.4±0.16 6.1±0.26
Metallised Polyester									
2	0.28±0.025	0.31±0.02	24.1±0.9	21.5±1.2	20.3±2.1	26.1±1.6	0.31±0.05	0.37±0.04	7.4±0.19 7.2±0.14
4	0.35±0.03	0.42±0.015	17.6±1.1	15.7±0.9	30.1±0.8	36.7±1.3	0.43±0.04	0.55±0.02	6.7±0.21 6.4±0.22
5	0.38±0.028	0.48±0.026	14.8±1.2	12.2±0.8	36.4±2.2	40.1±1.8	0.57±0.004	0.62±0.05	6.3±0.19 6.0±0.24
Paper Al-foil PE laminate									
2	0.26±0.023	0.29±0.03	26.1±0.7	23.2±0.9	18.2±1.2	23.8±1.4	0.26±0.05	0.32±0.03	7.6±0.23 7.4±0.21
4	0.31±0.018	0.36±0.015	23.3±1.1	19.1±0.7	24.7±0.9	30.7±1.1	0.36±0.04	0.49±0.02	7.2±0.19 6.9±0.24
6	0.37±0.023	0.44±0.019	16.1±1.2	13.2±0.9	31.4±1.3	37.3±1.1	0.45±0.03	0.58±0.03	6.7±0.21 6.3±0.16
SE	0.02	0.01	1.2	1.4	0.82	0.69	0.03	0.04	0.18 0.2

Storage periods significant at P<0.05

Table 3. Data on storage stability of I.M. Brinjal Chutney in PFP Pouches under RT and 37°C

Storage Period (months)	Browning (O.D. at 420 nm)		Reflectance (%)		Peroxide Value (mil.equi. O ₂)/Kg		Malonaldehyde (mg/Kg)		SO ₂ (ppm)	
	RT	37°C	RT	37°C	RT	37°C	RT	37°C	RT	37°C
0		0.16±0.034		26.2±1.2		12.7±1.2		0.11±0.02		205±3.3
1	0.28±0.03	0.39±0.024	21.1±0.9	19.2±1.4	13.2±1.1	15.3±1.2	0.16±0.037	0.27±0.028	188±4.2	172±3.7
2	0.37±0.029	0.51±0.03	17.9±1.1	16.1±0.8	19.4±1.6	23.7±1.4	0.28±0.03	0.41±0.027	171±2.8	162±3.3
3	0.45±0.04	0.58±0.28	15.8±0.7	13.4±1.3	24.3±0.9	29.9±1.4	0.39±0.32	0.56±0.31	164±4.1	156±4.6
4	0.58±0.024	0.71±0.023	12.2±1.1	10.1±1.3	31.8±1.2	36.7±2.4	0.51±0.024	0.64±0.03	157±3.7	141±3.5
SE	0.01	0.01	1.5	1.7	0.59	0.73	0.01	0.01	33.2	35.6

Storage periods significant at P<0.05

Table 4. Data on storage stability of H.T. processed Brinjal Chutney in PFP pouches under RT and 37°C

Storage period (months)	Browning (O.D. at 420 nm)		Reflectance (%)		Peroxide Value (mil.equi. O ₂)		Malonaldehyde (mg/Kg)		SO ₂ (ppm)	
	RT	37°C	RT	37°C	RT	37°C	RT	37°C	RT	37°C
0		0.18±0.032		28.2±1.1		10.6±1.3		0.08±0.02		223±4.2
2	0.25±0.024	0.31±0.018	26.2±0.9	24.4±1.3	16.1±1.1	21.4±0.9	0.21±0.012	0.26±0.018	192±3.8	171±3.6
4	0.36±0.018	0.45±0.023	29.2±1.2	19.1±0.8	23.6±1.4	33.1±1.3	0.37±0.021	0.43±0.015	168±3.9	142±2.9
6	0.43±0.023	0.56±0.02	19.8±1.4	15.4±0.9	30.3±1.5	37.2±1.1	0.48±0.014	0.54±0.022	142±3.1	115±3.4
SE	0.01	0.01	1.51	1.16	0.03	0.71	0.01	0.01	13.5	13.6

Storage periods significant at P<0.05

EFFECTS OF METHODS OF DRYING AND PRETREATMENTS ON QUALITY OF DEHYDRATED MUSHROOM

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ABSTRACT

Sun-drying, mechanical drying and micro-wave oven drying of mushrooms with different treatments of blanching were carried out. The dried samples were packed in polyethylene and polypropylene (100 gauge) bags, stored and evaluated. Dehydration ratio, shrinkage ratio and rehydration ratio were also determined. The quality of microwave oven dried sample was found to be the best.

INTRODUCTION

Importance of mushroom as a health food is well recognised in India and the production is increasing at a fast rate, from 4000 tonnes in 1985-86 to 30,000 tonnes in 1996-97. Mushrooms are consumed in various ways owing to their delicious flavour. They are rich in vitamins, minerals and high quality proteins and are low in calories and carbohydrates; hence suggested as a balanced food for sick people. Being highly perishable commodity, processing and preservation of mushroom is of vital importance, when the entire crop cannot be sold as fresh. Dehydration, being a comparatively cheaper method, is employed on a commercial scale, and oyster mushrooms are mostly traded in dried form. Hence the present study was taken up with the objective to improve the method and quality of drying and packaging.

MATERIALS AND METHODS

Fresh samples of oyster mushroom, *Pleurotus florida* were obtained from Mushroom Production Unit attached with the College of Horticulture, Vellanikkara, KAU. The experiments were laid out in a Completely Randomised Design (CRD) with 3 replications each.

Mushrooms harvested in the morning hours were sorted out for any damage or discolouration and washed thoroughly. Stalk ends were trimmed off and remaining stalks were split into two to facilitate fast dehydration 200 g samples were weighed and treated separately as follows:

- Blanching in boiling water for 3-4 minutes (T_1)
- Blanching in citric acid solution (0.3%) for 3-4 minutes (T_2)
- Blanching in (2% salt+0.3% citric acid) solution, followed

by steeping in KMS solution (1500 ppm SO_2) +0.1% citric acid for 30 minutes (T_3).

- Control - without any pretreatment (T_4)

Dehydration: All the pretreated samples were dried under 3 methods of drying, viz. sun drying, mechanical drying and micro wave oven drying. The temperature during sun drying ranged from 21.6°C to 35.7°C and the time taken was 14 hours for the pretreated samples and 12 hours for the untreated samples, to reach 5-6% moisture level. In mechanical drying, the temperature was maintained at 60°C for the first 4 hours and later at 50°C for the rest of 7 hours drying, and it took total of 11 hours of drying to reach a moisture content of 5-6% except the samples without any pretreatment which took only 8 hours. Microwave oven used was of T-23 Touch Electronic model. The power output was 700 watts with

microwave frequency of 2450 Hz. Three stage drying was given to the samples during microwave oven drying, the initial power level as 100 per cent for 20 minutes, followed by 60 per cent for another 20 minutes and 50 minutes for the rest of the period of drying. To reach 5-6% moisture, 90 minutes drying was required, whereas the samples without any pretreatment took only 75 minutes to accomplish 5-6% moisture.

The drying rates of the various samples were determined by taking the weights at regular intervals.

Dehydration ratio, shrinkage ratio, rehydration ratio : Dehydration ratio was determined by dividing the weight of the mushrooms loaded in trays by the weight of the finished product. For determining shrinkage ratio, the dimensions of random samples were measured, using vernier callipers before and after dehydration; the final volume obtained after dehydration was divided by initial volume. Shrinkage rate was determined by finding the percentage volume shrinkage at regular intervals during drying, as per Ocansey (1984). Weighed samples of dry mushroom was rehydrated in distilled water until maximum uptake of water took place, and the rehydration ratios were determined by dividing the weight of rehydrated samples by the weight of initial dried sample. The weights were taken at regular intervals during reconstitution to determine the reconstitution rate.

Packaging and storage : The dried samples of mushroom were packed in polyethylene and polypropylene

bags (100 gauge) and heat sealed. The samples were stored at room temperature for periodic evaluation.

Analysis during storage: The residual moisture content was determined as per Ranganna (1986). During storage, the percentage moisture pick up was found, at monthly intervals.

The chemical analyses included ascorbic acid and residual SO_2 as per Ranganna (1986) and protein as per Jackson (1956).

Sensory evaluation : Sensory evaluation of dried samples after reconstitution in hot water were compared with fresh samples on a 10 point hedonic scale by trained panel of 15 members.

RESULTS AND DISCUSSION

The fresh mushrooms on an average contained 92.4% moisture, 25.60% protein (on dry weight basis) and an ascorbic acid content of 4.0 mg/100g.

Dehydration : It took 90 minutes in microwave oven drying, 11 hours in mechanical drying and 14 hours in sun drying to reach a moisture content of 5-6%. No appreciable variation in the dehydration time was observed among the samples subjected to various pretreatments. The microwave oven dried and mechanically dried samples were better than the sun dried samples. Amongh the pretreatments, the samples dried after blanching in citric acid + salt solution followed by steeping in citric acid + KMS solution produced a superior product, when compared to samples dried after blanching in boiling

water or blanching in citirc acid solution. The control sample dried without any pretreatment, was having better colour immediately after drying, but darkened and developed off-flavour subsequently on storage after one month.

Mushrooms have very delicate texture and aroma and as such they require special precautions during the dehydration process. Blanching itself seemed to adversely affect the quality of the product, especially the colour, texture and rehydration properties (Table 1). However, for complete inactivation of enzyme, blanching was found very essential (Pruthi et al., 1978). These reasons may be attributed to the initial retention of better colour and texture, in the unblanched lots compared to the blanched lots.

Mushroom samples dried after blanching in citric acid + salt solution and steeping in KMS + citric acid solution for 30 minutes showed the best colour and overall appearance out of the pretreated samples; sulphuring or sulphiting is known to prevent the enzyme catalysed oxidative charges, inhibit microbial deterioration and facilitate drying by plasmolysing the cells (Tanga, 1974). The texture was adversely affected compared to unblanched, dried samples, which might be due to the blanching treatment. But blanching was found essential to completely inactivate the enzymes to prevent browning of the dried product.

Out of the three methods of drying, the mushrooms dried under microwave oven was found to have the best colour, flavour and texture.

Ruello (1987) and Rao et al. (1995) reported that microwaved food had appearance and taste quite different from conventionally cooked food, thus resulting in better sensory quality.

The unblanched samples took relatively lesser time in all the three methods of drying; this difference in time for drying may be attributed to difference in bound moisture content (Table 2; Fig. 1, 2 & 3). Highest yield was recorded in microwave oven drying followed by mechanical and sun drying. The highest yield in microwave oven drying may be attributed to the shorter period of exposure of the material to heat damage; followed by mechanical drying with the lowest in sun drying due to longer time of exposure to heat damage. Decareau (1984) reported that microwave processing resulted in shorter processing time, higher yields and better quality than by conventional drying.

Out of the four pretreatments, citric acid + KMS + salt recorded the highest yield. Probably the particles of citric acid, KMS and salt might have entered the intercellular spaces of mushrooms, thus contributing to the higher weight; in addition, steeping of mushrooms in citric acid + KMS solution must have increased the bound moisture content, thus resulting in higher weight of the dried product, which is evident from the results on analysing the residual moisture content of the samples immediately after drying. The rate of drying was rapid for the samples dried without any

pretreatment in all the methods of drying, compared to all other treatments, which is due to the lower bound moisture content in the samples.

The fastest rehydration and highest reconstitution was exhibited by the samples dried without any pretreatment, when compared to the blanched samples (Table 3). The elasticity of cell walls and swelling power of starch, which are important for good rehydration are reduced during the treatment, hence the lower rehydration ratio of blanched samples.

The residual moisture content was maximum in the sun dried samples followed by mechanical and microwave oven dried samples. This indicates that microwave oven drying was the most efficient with maximum removal of moisture in a shorter duration. When comparing the treatments, the samples dried after blanching in citric acid + salt solution followed by steeping in citric acid + KMS solution was having the highest residual moisture content. This might be because of the increased bound moisture content due to steeping, resulting in higher initial moisture content. A gradual increase in the moisture content was observed during storage in all the dried samples, irrespective of packaging material used.

A substantial reduction in the ascorbic acid content was observed in all the dried samples; however the reduction was least in microwave oven dried sample; and maximum loss was observed in sun dried samples, which might be due to longer exposure to heat as ascorbic

acid is heat labile. A reduction of ascorbic acid was also found in all the samples during storage.

A significant reduction of protein in the blanched samples compared to unblanched samples immediately after blanching was observed. The reduction of protein content may be attributed to the denaturation of protein due to heat treatment during blanching. A gradual decline in protein from 1st to 6th months of storage was observed, and the reduction was significant. This might be due to increased proteinase activity during storage.

When the samples pretreated with citric acid + salt + KMS combination were analysed for the residual SO_2 content, all were having levels within the prescribed FPO limit (2000 ppm). Maximum residual SO_2 was detected in the microwave oven dried samples, compared to mechanically dried and sun dried samples. Since SO_2 will escape as gas when exposed to heat for longer periods, sun dried samples showed minimum residual SO_2 followed by mechanically dried samples.

Dried samples after reconstitution when evaluated sensorily in comparison to fresh samples were not at all comparable, but the dried samples when powdered and prepared into soup, it was well appreciated and accepted by the panel unanimously. Therefore, mushroom when available in plenty can be dried and stored effectively for the end use as an ingredient for soup making; and the best drying technique evolved

is microwave oven drying after pretreatment with KMS + salt + citric acid. Though microwave oven drying is an expensive proposition, quality-wise it outstands all the rest; but on a commercial scale, mechanical drying can also be resorted to.

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Table 1. Dehydration ratio, shrinkage ratio, reconstitution ratio and extent of discolouration due to drying of mushroom, *P. florida* dried under different techniques.

Treatment	<i>P.florida</i>			
	Dehydration ratio	Shrinkage ratio	Reconstitution ratio	Extent of discoloration due to drying
T ₁ SD	10.99 ^a	0.197 ^{cde}	2.10 ^f	B
T ₂ SD	10.75 ^d	0.186 ^{de}	2.10 ^f	B
T ₃ SD	9.97 ^g	0.201 ^{cd}	2.16 ^{ef}	LB
T ₄ SD	10.83 ^c	0.182 ^e	2.48 ^b	CW
T ₁ MD	10.92 ^b	0.206 ^{bc}	2.18 ^{ef}	B
T ₂ MD	9.62 ^h	0.184 ^{de}	2.02 ^f	B
T ₃ MD	8.25 ^j	0.212 ^{be}	2.26 ^{de}	CY
T ₄ MD	10.79 ^{cd}	0.197 ^{cde}	3.99 ^a	CW
T ₁ MW	10.29 ^e	0.221 ^{ab}	2.36 ^d	B
T ₂ MW	9.53 ⁱ	0.197 ^{cde}	2.37 ^d	B
T ₃ MW	7.96 ^k	0.236 ^a	2.63 ^c	CY
T ₄ MW	10.20 ^f	0.197 ^{cde}	4.09 ^a	CW

The values represent means of 3 replications.

The values with different superscripts differ significantly at 5% level.

B - Brown; LB - Light brown; CY - Creamy yellow; CW - Creamy white.

SD - Sun Drying, MD - Mechanical Drying, MW - Microwave oven drying

Table 2. Drying rate of *P. florida* dried under different techniques.

Treatment	Sun-drying Hours				Mechanical drying Hours				Microwave oven drying Minutes			
	3	6	12	14	2	6	8	11	15	45	75	90
T1	46.03 ^c	14.51 ^c	9.38 ^c	9.09 ^c	54.07 ^c	16.46 ^b	10.55 ^c	9.16 ^c	29.05 ^b	9.94 ^c	9.77 ^c	9.73 ^c
T2	43.65 ^d	12.76 ^d	9.48 ^b	9.30 ^b	58.14 ^c	15.58 ^b	11.69 ^b	10.40 ^b	23.94 ^c	11.11 ^b	10.68 ^b	10.50 ^c
T3	54.11 ^a	19.94 ^b	10.13 ^a	10.03 ^a	75.33 ^a	26.64 ^a	15.85 ^a	12.12 ^a	33.20 ^a	12.69 ^a	12.59 ^a	12.56 ^a
T4	51.76 ^b	27.07 ^a	9.23 ^d	-	65.69 ^b	10.60 ^c	9.26 ^d	-	29.76 ^b	9.93 ^c	9.81 ^c	-

The values represent means of 3 replications.

The values with different superscripts differ significantly at 5% level.

- denotes the treatments which completed drying.

Table 3. Rate of reconstitution of mushroom *P. florida* dried under different techniques.

Treatment	<i>P. florida</i>		
	30	60 (Minutes)	90
T ₁ SD	200.90 ^{de}	206.16 ^{def}	210.08 ^e
T ₂ SD	187.09 ^{de}	191.33 ^{fg}	209.96 ^e
T ₃ SD	201.16 ^{de}	209.33 ^{de}	216.36 ^d
T ₄ SD	334.96 ^b	348.39 ^b	-
T ₁ MD	196.84 ^{de}	201.25 ^{efg}	217.58 ^d
T ₂ MD	184.90 ^c	186.83 ^g	202.41 ^f
T ₃ MD	204.39 ^d	209.13 ^{de}	226.40 ^c
T ₄ MD	396.04 ^{de}	399.13 ^a	-
T ₁ MW	201.83 ^{de}	218.18 ^d	236.06 ^b
T ₂ MW	201.94 ^{de}	211.34 ^{de}	236.62 ^b
T ₃ MW	231.90 ^c	236.94 ^c	262.94 ^a
T ₄ MW	401.98 ^a	409.00 ^a	-

The values represent means of 3 replications.

The values with different superscripts differ significantly at 5% level.

- denotes the treatments which completed drying.

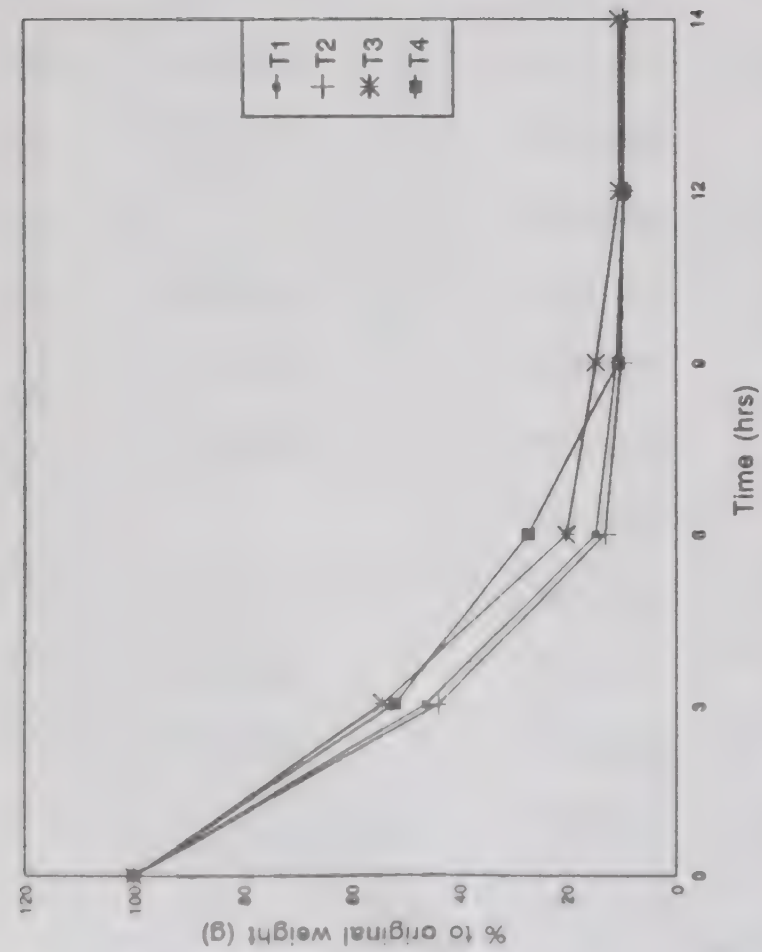


Fig.1: Drying curve of sun-dried mushroom *P. florida* under various pre-treatments

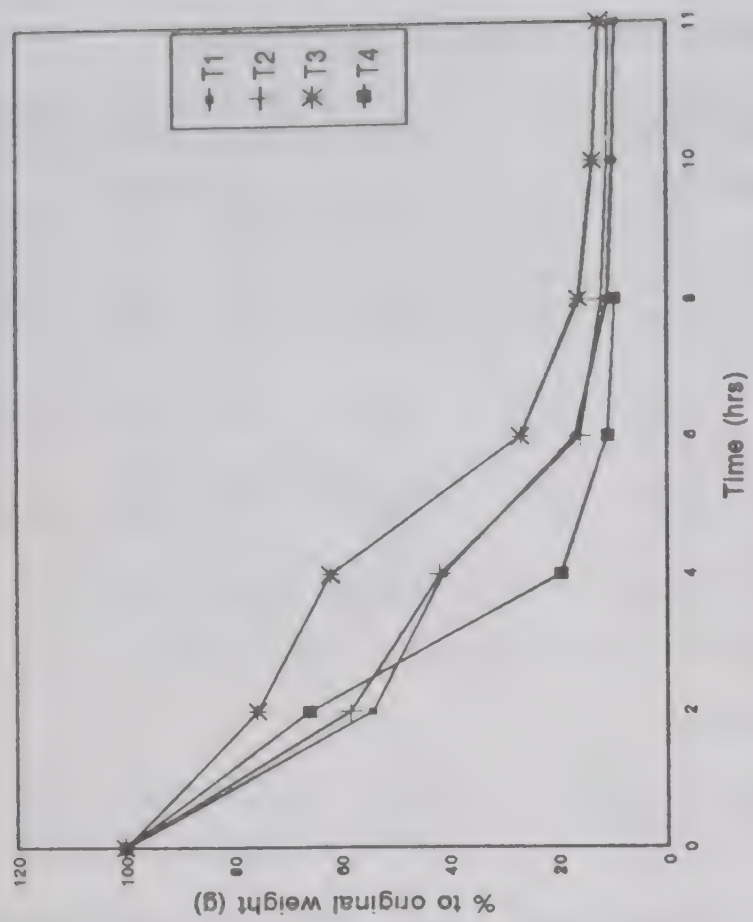


Fig.2 Drying curve of mechanically dried mushroom *P. florida* various pre-treatments

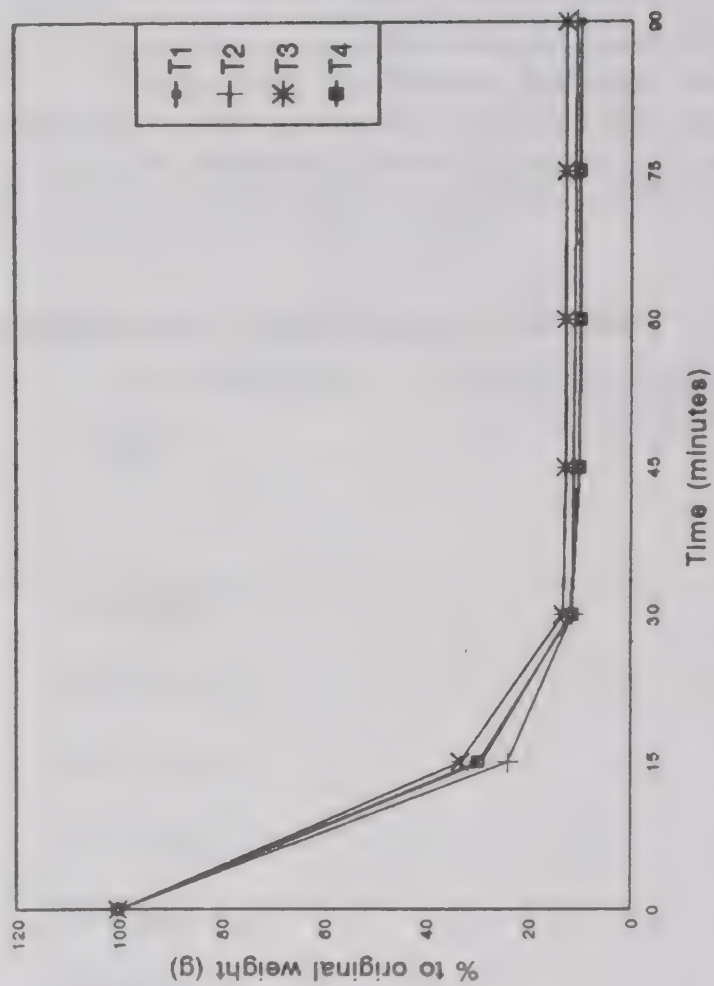


Fig.3 Drying curve of microwave oven dried mushroom *P. florida* under various pre-treatments

EXTENSION OF SHELF LIFE OF CUCUMBER BY MODIFIED ATMOSPHERE PACKAGING (MAP) AND SHRINK WRAPPING

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ABSTRACT

Cucumbers were either packed in unventilated polyethylene (PE) film or individually shrink wrapped with different polymeric films (Polyolefin & polyethylene) and stored at 10, 15, 20°C and RT (24-28°C) to study the effect of film wrapping on the shelf life and quality. The optimum storage temperature for cucumbers shrink wrapped with PE and Polyolefin films was found to be 10 and 15°C respectively. Maximum extension of storage life was achieved by shrink wrapping with PE film (24 days) followed by MAP with PE film (22 days) at 10°C storage with an additional shelf life of 2 days at ambient temperature. Both MAP and shrink wrapping greatly reduced the weight loss and maintained the firmness during storage at different temperatures.

INTRODUCTION

Cucumbers are highly perishable tropical vegetable and are not suited to long term storage at very low temperatures. The main deteriorative changes in cucumbers during storage and distribution are mostly due to yellowing, loss of moisture leading to shrivelling and physiological injury caused by low temperature (Adamicki, 1985). Cucumbers are susceptible to chilling injury at 10°C or low temperature and to yellowing at 15°C or higher, thus restricting the optimum storage temperature to a narrow range (Salunkhe and Desai, 1984). Further, they are very susceptible to shrivelling and hence the humidity during storage, transport and marketing should be kept at 90-95% (Risse *et al.*, 1985). For the fresh market, cucumbers are usually waxed to reduce moisture loss, which however has been shown to increase the incidence of decay in cucumbers

(Segall *et al.*, 1974). The use of polymeric films has gained importance in reducing the moisture loss and maintaining the freshness because of its convenience and low cost. Individual film wrapping or seal packing of fruits and vegetables has also shown to reduce weight loss and extended the post harvest life without refrigeration or humidity control. With the recent development of new films and packaging techniques, promising results would possible be obtained with a variety of vegetables also. The present investigation was carried out to test the efficiency of selected polymeric films in controlling the moisture loss and extending the post harvest life of cucumber stored at different temperatures either by MAP or individual shrink wrapping

MATERIALS AND METHODS

Freshly harvested, uniform size (8 to 9") cucumbers of optimum maturity were selected for the study.

They were washed in tap water and used for packing after removing the surface moisture by air-drying.

Modified Atmosphere Packaging : Cucumbers were individually packed in unventilated, low density polyethylene (LDPE) bags (12 x 6" size) of 25µ thickness.

Shrink wrapping : The cucumbers were shrink wrapped individually using either heat shrinkable polyolefin films (BDF-2001, a multi layered co-extruded polyolefin of 25µ thickness and D-955, a multi layered cross-linked polyolefin of 25µ thickness), procured from Cryovac, W. R. Grace & Co. or LDPE film of 25µ thickness. The fruits were individually sealed in pouches using a hot wire L - sealer (Weldotron model 6300-L) and shrunk by passing through a heat shrink tunnel (Weldotron model 7121A) at 300-350°F with a traveling time of 10 seconds.

Storage temperatures : The wrapped (MAP and Shrink wrapped

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Permeability properties of different films used for wrapping cucumbers (Tests done by Centre for Packaging, CFTRI, Mysore, India)

Film Trade Name	Thickness (μ)	Permeability		
		WVTR*	CO ₂ **	O ₂ **
LDPE	25	18	42000	7800
BDF-2001	25	8.3	19.2	48
D-955	25	10.0	27876	6447

*g/m².d at 38°C and 90% RH. **cc/m².day.atm at 27°C

cucumbers were stored at 10,15,20°C and RT (24-28°C). Each treatment had three replications of 6 packs each.

Observations were taken periodically on physiological loss in weight (PLW%), visual colour, firmness, respiration rates, sensory qualities and spoilage.

PLW(%): Cucumbers were weighed periodically and weight loss was calculated as per cent of weight loss over the initial weight.

Firmness : Firmness was measured at two equatorial points using an Instron - Universal pressure testing instrument (model 4201) fitted with a 8 mm diameter cylindrical plunger with load range set at 25 kg and cross head speed at 100 mm/minute. The firmness was measured both with the peel and after removing the peel of the same fruit.

Shelf life : Shelf life was determined based on the loss of green colour, development of yellow colour, softening and shrivelling especially at the fruit ends, rotting and development of chilling injury symptoms.

Respiration rate : Individual fruits were enclosed in the respiration jars for one hour after which 1 ml sample of head space gas was

removed and injected into a Gas chromatograph (Hewlett Packard 5890 series II) fitted with Porapak Q column. CO₂ was detected by TCD with N₂ as carrier gas (at 30-ml/minute & flow) and quantified using external standard in HP 2296 series II Integrator and expressed as mg CO₂ Kg⁻¹ h⁻¹.

Sensory evaluation: The organoleptic quality of the stored cucumbers was assessed by a panel of 10 judges on a scale of 0 to 10 (where 0=very poor and 10=Excellent) for each of the four sensory characters viz, appearance, crispiness, juiciness and cucumber flavour. The means of the total scores for each samples were found out and the samples with a score of above 6 were considered commercially acceptable.

RESULTS AND DISCUSSION

Cumulative physiological loss in weight (CPLW%): Both modified atmosphere packaging (MAP) and individual shrink wrapping greatly reduced the weight loss of cucumbers stored at different temperatures (Table 1). The CPLW% of wrapped (MAP and shrink wrap) cucumbers were below 1.0% even after 22 days of storage as compared to that of 8.28 to 11.0% in case of unwrapped cucumbers at the end of 14 days

itself at different storage temperatures. Sealing cucumbers in plastic films was also reported to significantly reduce the weight loss during storage at different temperatures (Elkashif *et al.*, 1985a; Homin and Woo, 1999). Among the different films used for shrink wrapping, the reduction in weight loss was the highest when wrapped with BDF-2001 film followed by D-955 and PE film resulting in less loss of moisture from the cucumbers.

Firmness (Kg): The firmness of cucumbers was measured with peel and after removing the peel and the data are presented in Table 2. Film wrapped cucumbers (both MAP and Shrink-wrap) maintained their firmness during storage at different temperatures as compared to unwrapped cucumbers. Film wrapping was also reported to maintain firmness of many fruits and vegetables (Risse, 1989), lemons and peppers (Ben Yehoshua *et al.* 1983), cucumbers (Elkashif, 1983), capsicum (Hughes *et al.*, 1981) and tomato (Risse *et al.*, 1985b) during storage at various temperatures. However, the firmness was maintained better at 10°C when wrapped with PE film (MAP and shrink wrap) and it was better at 15°C when the fruits were shrink wrapped with polyolefin films i.e., BDF and D-955 films. At ambient temperature, shrink wrapping with BDF-2001 film followed by MAP with PE film helped better in retaining the texture of the fruit when compared to other packages. This indicates that the suitability of packing method varies with storage temperature in maintaining the firmness of the cucumbers. However, there was not much

difference in the firmness of fruits after removing the peel among the different packages. The firmness of film wrapped and low temperature stored cucumbers could be maintained even 2 days after shifting to ambient temperature. However, the optimum storage temperature for cucumbers shrink wrapped with the polyolefin films (BDF-2001 and D-955) was found to be 15°C where it could be stored for 16 days. Wrinkling/shrivelling of stalk ends and rotting of fruits restricted the shelf life at 10°C when cucumbers were shrink wrapped with polyolefin films. This shows that PE film wrapping (either MAP or shrink wrap) effectively controlled the low temperature injury and extended the shelf life by maintaining the firmness (Table 2) and reducing the respiration rate (Fig. 1) at 10°C as compared to other films.

Sensory characters: Cucumbers shrink wrapped with PE film and stored at 10°C obtained the highest total score (appearance, texture, juiciness and flavour) followed by those with MA packing at the end of 22 days of storage (Table 4). The quality of these cucumbers was maintained even 2 days after shifting to ambient temperature. However cucumbers shrink wrapped with polyolefin films were acceptable (scores above 6.0) up to a maximum of 16 days only at 15°C storage temperature.

Respiration rate : The respiration rate of cucumber was high (154.2 mg CO₂kg⁻¹h⁻¹) on the day of harvest and dropped to 80 mg CO₂kg⁻¹h⁻¹ within a day of storage at room temperature. At 10°C the respiration rate of cucumber was reduced to 28 mg CO₂kg⁻¹h⁻¹

within a day of storage and gradually decreased during storage (Fig. 1). Shrink wrapping with different films reduced the respiration rate and maintained lower than control throughout the storage period both at RT and 10°C.

CONCLUSION

The storage life of cucumbers could be extended to 22-24 days either by individual shrink wrapping or modified atmosphere packaging with low density polyethylene film and storing at 10°C.

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Table 1. Effect of MAP and Shrink-wrapping on CPLW (%) of cucumber during storage at different temperatures.

Packing method	Storage Temp. (°C)	Storage period (Days)				
		5	9	14	16	22
MAP with PE	10	0.18	0.24	0.32	0.34	0.45
	15	0.14	0.20	0.26	0.28	0.39
	20	0.15	0.26	0.37	0.42	0.61
	RT	0.20	0.36	0.62		
Shrink wrap with D-955 film	10	0.04	0.16	0.22	0.25	0.39
	15	0.09	0.13	0.21	0.24	0.37
	20	0.15	0.23	0.33	0.47	0.59
	RT	0.37	0.64	0.97		
Shrink wrap with BDF-2001 film	10	0.01	0.09	0.12	0.16	0.29
	15	0.06	0.10	0.15	0.18	0.25
	20	0.11	0.19	0.31	0.36	0.45
	RT	0.28	0.50	0.77		
Shrink wrap with PE film	10	0.11	0.27	0.43	0.47	0.68**
	RT	0.31	0.54	0.75		
Control (unwrapped)	10	2.52	5.45	8.28		
	15	2.69	4.52	6.78		
	20	3.67	4.03	5.59		
	RT	5.31	8.61	11.04		

Values are means of 2 years, 3 experiments

** on 24th day

Table 2. Effect of MAP and Shrink wrapping on firmness (kg) of cucumber during storage at different temperatures

Packaging type	Storage temp. (°C)	Storage period (days)											
		9				16				22			
		A		B		A		B		A		B	
		16d LT+2d		RT		22d LT+2d		RT		22d LT+2d		RT	
		A	B	A	B	A	B	A	B	A	B	A	B
MAP with PE Film	10	8.60	6.94	8.35	6.08	8.19	5.63	8.22	6.13	7.61	5.69		
	15	8.42	6.54	8.05	6.08	7.40	5.86	8.15	6.05	7.20	5.45		
	20	8.18	6.09	7.98	6.19	7.31	5.48	7.54	6.02	6.92	4.13		
	RT	8.18	5.31										
Shrink wrap with D-955 film	10	8.77	6.50	8.18	6.09	6.92	5.71	8.15	6.40	6.36	4.71		
	15	8.66	6.71	8.39	6.07	7.57	5.89	8.13	5.41	7.74	5.08		
	20	7.75	5.58	7.68	5.87			7.62	5.63				
	RT	7.54	5.69										
Shrink wrap with BDF-2001 film	10	8.70	7.00	8.39	6.24	8.09	5.66	8.10	5.70	7.69	6.36		
	15	8.98	6.48	8.78	5.68	8.32	6.40	8.69	6.21	7.65	5.13		
	20	7.73	5.32	7.13	5.63			7.04	5.86				
	RT	8.70	6.10										
Shrink wrap with PE film	10	8.53	6.31	8.36	5.45	8.32*	6.52*	8.41	5.79	7.88**	6.43**		
	RT	7.77	6.33	7.49	5.32								
Control (unwrapped)	10	8.01	7.38	7.31	5.44			7.48	5.75				
	15	7.98	5.40	7.30	5.96			6.95	5.59				
	20	7.37	6.01	6.41	5.16			7.06	4.37				
	RT	6.56	4.36										

Values are means of 2 years and 3 experiments. RT = 24-26°C; A=with peel; B= without peel
 * 24 days ** 24 + 2 days Initial firmness of cucumbers : With peel = 9.18kg; Without peel = 6.20kg.

Table 3. Storage life of film wrapped cucumbers stored at different temperatures.

Packing method	Storage life (Days)			
	10°C	15°C	20°C	RT (24-28°C)
Map with LDPE	22	16	16	7
Shrink wrap with PE film	24	ND	ND	9
Shrink wrap with D-955 film	9	16	9	7
Shrink wrap with BDF-2001 film	9	16	9	7
Control (unwrapped)	5	9	5	3

Values are means of 2 years, 3 experiments

ND=not done

Table 4. Sensory evaluation scores of cucumbers stored at different temperatures.

Packaging type	Storage temp. (°C)	Total sensory score		
		Storage period (days)		
		16	22	22 days at LT + 2days at RT
MAP with PE film	10	7.83	6.93	6.88
	15	6.92	6.20	5.78
	20	6.00	5.60	5.45
Shrink wrap with D-955 film	10	5.92	5.53	4.56
	15	6.42	5.67	4.89
	20	5.92	5.06	5.00
Shrink wrap with BDF-2001 film	10	6.00	5.47	4.89
	15	6.42	5.60	5.27
	20	5.17	4.40	ND
Shrink wrap with PE film	10	8.83	8.50	8.23
Control (unpacked)	10	4.42		
	15	5.33		
	20	4.42		

Score range = 0 to 10

Where 0 = very poor, 10 = excellent and >6 = acceptable

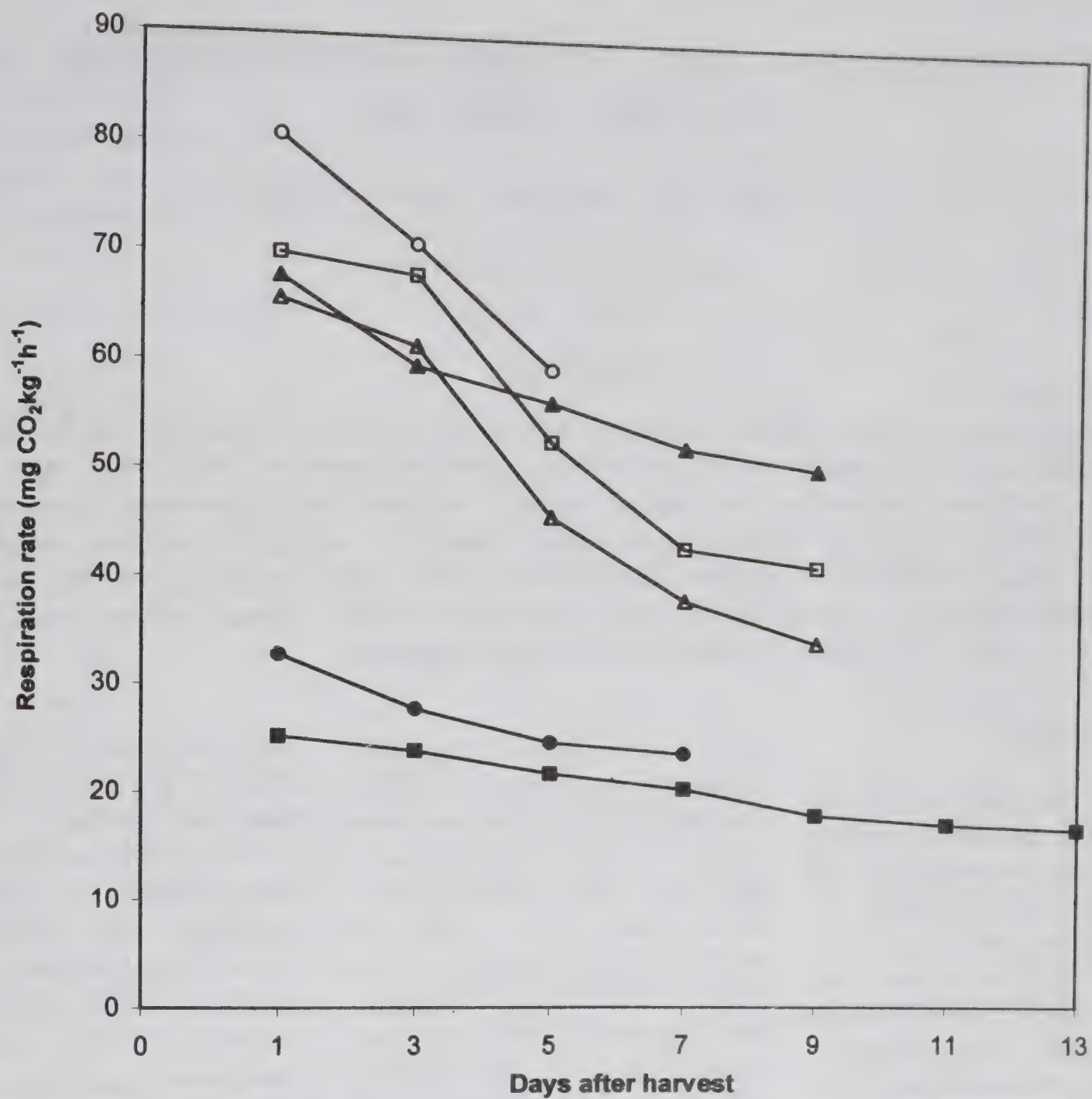


Figure 1. Respiration rate of cucumber during storage.

- Control (RT)
- ▲— Shrink wrap BDF film (RT)
- Control (10°C)
- ◻— Shrink wrap PE film (RT)
- ▲— Shrink wrap D-955 film (RT)
- Shrink wrap PE film (10°C)

STUDIES ON THE STORAGE BEHAVIOUR OF INSTANT VADA MIX

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ABSTRACT

Instant *vada* mixes were prepared with and without the addition of hydrogenated fat (*dalda*). The instant mixes were packed in PP and MPP pouches and protected with brown paper bags and stored at room temperature. The chemical changes, microbial load, organoleptic characteristics and the effect of packaging materials were studied during the storage by analysing at regular intervals. The development of rancidity was observed in the samples prepared with the addition of hydrogenated fat after storing for 150 days. The shelf life of the instant *vada* mix was found to be more than six months in both the packaging materials.

INTRODUCTION

During the last two decades there has been considerable progress both in the development of convenience foods suitable for Indian palate and in their commercial production and marketing. Rapid industrialization and urbanization and changes in eating habits of Indian people led to very high demand for ready-to-use snack products. The convenience instant foods are meeting the urgent and exigency situations of offering hospitality to unexpected guests (Bhaupendar Singh and Shurpalekar, 1989). The instant *vada*, *pakora*, and *bajji* mixes were generally made from flours of bengalgram, blackgram, wheat and rice. An attempt was made to formulate an instant *vada* mix and to study the storage stability of the same.

MATERIALS AND METHODS

Bengalgram *dhal*, blackgram *dhal* and raw rice were ground in

a mixie separately. The ground bengalgram was sieved in a BS 14 sieve and the rest of the items were sieved in BS 36. Then the ground flours were dried separately in a cabinet drier at 80° C for two hours and cooled. Bengalgram flour (85 g), *maida* (5g), blackgram flour (5g) and rice flour (5g) were mixed. To the mix, salt (2g), citric acid (0.01 per cent) and sodium bicarbonate (0.1 per cent) were added and mixed thoroughly (T1). Another batch of instant *vada* mix was prepared by mixing the melted and cooled hydrogenated fat (20g) (T2). The instant *vada* mix samples (100g) were packed in polypropylene pouches (250μ) (PP) and metallised polyester (12μ) low density polyethylene (48μ) laminate pouches (MPP). Each pouch was protected by keeping inside the brown paper bag and stored at room temperature.

Moisture, fat and acidity were estimated by the method described by Ranganna (1995). The pH

(Hart and Fisher, 1971), protein (Lowry et al., 1951), amino acids (lysine and methionine) (Block et al., 1956 and Mahadevan and Sridhar, 1986), β carotene (NIN procedure) and microbial load (Istavan kiss, 1986) were analysed periodically in the stored samples. The samples were subjected to Kresis test as described by Triebold and Aurand (1963) for assessing the rancidity development. Sensory qualities of *vada* prepared from instant *vada* mixes were evaluated by using 10 untrained judges by grading on a 4 point hedonic scale.

Preparation of *vada* from instant *vada* mixes

For preparing *masala vada* from 100 g of the instant *vada* mix, the required quantum of water (65 ml/100g) was added followed by cut pieces of onion (15g), Green chillies (15g), ginger (5g) and curry leaves (2g) and mixed well. The prepared dough was allowed to stand for 30 minutes. The dough was made into

a medium size balls and flattened into a *vada* shape, and deep fat fried at 150° C for 5 minutes. Hydrogenated fat (20 g) was added to the instant *vada* mix packed without hydrogenated fat while preparing *vada*.

RESULTS AND DISCUSSION

The changes noted in the chemical composition on instant *vada* mixes packed in P₁ and P₂ such as moisture, pH, acidity, lysine, methionine and β carotene are presented in Table 1. The initial moisture content of the instant *vada* mix was 9.80 and 9.52 in T1, 9.65 and 9.70 per cent in T2 packed in P1 and P2 respectively after 180 days of storage. The reduction in moisture control of the cowpea based instant *vada* mix and *medhu vada* mix incorporated with soy protein isolate (SPI) were observed by Manimegalai et al., 1997 and Ramalingam, 1994 respectively packed in polythylene bags.

The instant mixes T1 and T2 packed in both the packaging materials showed a slight change in pH and acidity during the study period. The percentage reduction of protein, lysine and methionine noted in the stored instant *vada* mixes was 5.5, 3 and 3.8 respectively at the end of the storage period. The study indicated that the packaging materials did not have any direct influence on the reduction of protein and amino acid content of the samples during storage.

The instant *vada* mix T1 had recorded lesser β carotene content throughout the study period than

the T2 in which hydrogenated fat was added during processing. A significant reduction in β carotene was reported by Sharma et al., 1995 in the instant *kadhi* mix samples packed in PP and MPP stored at room temperature.

The instant *vada* mix T1 did not show rancidity development even after storing for 180 days whereas the samples prepared with the addition of hydrogenated fat showed the rancidity development in P1T2 and P2T2 after storing for 150 and 180 days respectively. The instant *vada* mix samples were free from microbial population at zero day. The bacteria, fungi and yeast count ranged between 2.0 to 4.0x10⁶/g, 2.0 and 4.0 x 10⁴/g and 1.0 and 2.0x10⁵/g respectively after storing for 180 days of storage.

The weight, volume and bulk density of the *vada* prepared with and without the addition of hydrogenated fat and packed in different packaging materials had more or less similar values at each interval throughout the storage period.

The *vadas* prepared from the instant *vada* mix T1 had maintained higher score (4.0) upto 120 days for texture and overall acceptability whereas the other characteristics such as appearance, colour, flavour and taste had maintained the higher score (4.0) throughout the storage period. The *vadas* prepared from the instant mix with the addition of *dalda* had maintained higher score (4.0) for appearance and colour throughout the storage period whereas the scores for other characteristics ranged between 4.0 and 3.9 because

of the development of rancidity.

CONCLUSION

The study revealed that the instant *vada* mix prepared could be stored in sound condition without changing its original characteristics for more than 6 months specially in the MPP pouch.

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Chemical constituents	0 Day		90th Day				180 Days			
	P ₁ T ₁	P ₂ T ₁	P ₁ T ₂	P ₂ T ₂	P ₁ T ₁	P ₂ T ₁	P ₁ T ₁	P ₂ T ₁	P ₁ T ₂	P ₂ T ₂
Moisture %	9.60	9.61	9.77	9.73	9.61	9.52	9.61	9.52	9.65	9.70
pH	4.72	4.73	4.72	4.73	4.69	4.69	4.69	4.69	4.69	4.70
* Acidity %	0.1559	0.1551	0.1565	0.1559	0.1636	0.1621	0.1636	0.1621	0.1631	0.1623
* Protein, g/100g	25.99	26.00	26.04	26.06	25.14	25.14	25.14	25.14	25.18	25.19
* Lysine, mg%	1285.91	1286.14	1288.39	1288.53	1252.08	1252.20	1252.08	1252.20	1253.99	1254.75
* Methionine, mg%	481.18	481.26	482.11	482.16	466.36	466.39	466.36	466.39	467.07	467.36
* β carotene, (μg/100g)	113.33	116.17	144.08	146.87	104.99	107.76	104.99	107.76	135.58	138.43

* Significant
 P1 Polypropylene pouch
 P2 Metallised polyester polyethylene laminate pouch
 T1 Instant vada mix without Dalda
 T2 Instant vada mix with Dalda

EFFECT OF MODIFIED ATMOSPHERE ON AEROBIC MESOPHILIC AND PSYCHROPHILIC MICROFLORA OF MANGO FRUITS

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ABSTRACT

Effect of modified atmosphere on aerobic mesophile and psychrophilic microflora of mango fruits was studied. Storage of mango fruits, cv. *Mallika* in ventilated LDPE bags (0.25 and 0.5% ventilation) at low temperature showed lower microbial load compared to fruits stored in open baskets. Minimum mesophilic counts were observed in fruit packed in 0.25% ventilated LDPE bags. No psychrophile was observed in fruits kept under modified atmospheric conditions (ventilated poly bags).

INTRODUCTION

Fresh mango fruit carries the load of a variety of microorganisms which subsist on traces of nutrients available on its surface. This population mainly comprises of mesophiles. Under ambient storage conditions, these mesophiles multiply swiftly in number and may spoil the fruits. *Dashehari* mango fruits could be stored for 21 days at 12°C and for 4 days at room temperature (Narayana and Singh, 1996). However, at low temperature, humid and oxygenic conditions may favour the growth of psychrophilic microorganisms which may lead to spoilage or quality loss after transfer to ambient conditions. Storage of mango fruits in ventilated LDPE bags (0.25 and 0.5% ventilation) has shown better appearance and less spoilage compared to fruits kept in open baskets (Singh and Narayana,

1995). There are several reports that these atmospheres also inhibit the growth of a number of microorganisms on various horticultural commodities (Buick and Damaglou, 1987; EL-Goorani and Somner, 1981; Garg *et.al* 1990; Ohta and Sasaki, 1996). In the present study, it was aimed to study the effect of extent of ventilation on aerobic mesophilic and psychrophilic microflora of fruits during storage.

MATERIALS AND METHODS

Mature hard green mango fruits, cv. *Mallika*, of uniform size were packed in 1Kg capacity (24X20 cm) LDPE bags of 200 gauge thickness. The bags were provided with two levels of ventilation, viz. 0.25 and 0.5% as per method described by Singh and Narayana (1995). Ventilation

was provided in the form of circular holes of 0.4 cm diameter. The percentage of ventilation was calculated based on the total surface area of polybags. Control fruits were kept as such in open plastic baskets. These fruits were stored at 12°C, 85-90% R.H. After 21 days of storage, five mango fruits from each treatment were taken out randomly in sterilized bags. Surface of each mango fruit was washed separately with 10 ml sterilized distilled water. Its further dilutions were made in sterilized distilled water. One ml of properly diluted sample was plated on Rose Bengal Chloramphenicol Agar and Nutrient Agar plates for counting the number of yeasts, moulds and bacteria, respectively (Collins and Lyne, 1985). One set of plates was incubated at ambient temperature (30±5°C) for 3 days for counting

mesophilic population. For counting the psychrophilic population, another set of plates was incubated in refrigerator (5°C) for 10 days. the number of colony forming units (CFU) per fruit was determined. Average of five replicates was taken and log number of colony forming unit was determined.

RESULTS AND DISCUSSION

Psychrophilic population represents the microbial load of cold storage chamber while mesophilic population represents natural microflora of fruits. Other possible sources are field soil, harvester, transport van etc. Fig.1 represents the aerobic mesophilic microbial load of open and prepackaged fruits in polybags. It was observed that the control mango fruits contained highest number of aerobic mesophilic microflora (5.7×10^5 CFU yeasts and moulds and 3.7×10^6 CFU bacteria) per fruit. Mesophilic counts were lowest in mango fruits kept in 0.25% ventilated polybags. Psychrophilic yeasts and moulds (3.1×10^2 CFU per fruit) were observed only in control mango fruits but their presence could not be detected in mangoes kept in 0.25 or 0.5% ventilated LDPE bags. Psychrophilic bacteria were totally absent in all the treatments. Lesser microbial counts in fruits from 0.25% ventilated LDPE bags might be because of less ventilation which resulted in more accumulation of CO₂ which in

turn inhibited microbial growth as compared to fruits packed in 0.5% ventilated polybags or control fruits (Fig.1).

Modified atmosphere and controlled atmosphere are being used to extend the shelf life of various fruits and vegetables (El-Goorani and Somner, 1981; Splittstosser, 1995). By reducing the oxygen and increasing CO₂ concentrations, respiration and ethylene production are retarded and thus the rate of ripening followed by senescence are reduced (Kader, 1986). These atmospheres also inhibit the growth of Pseudomonads and other Gram negative bacteria (Buick and Damaglou, 1987; El-Goorani and Somner, 1981; Garg *et.al* 1990; Ohta and Sasaki, 1996). The present study clearly indicated that mangoes kept in 0.25% ventilated LDPE bags have least microbial load as compared to those kept in 0.5% ventilated LDPE bags or in open baskets. The data supports our earlier finding that mangoes kept in ventilated bags have better appearance and quality compared to control.

ACKNOWLEDGEMENT

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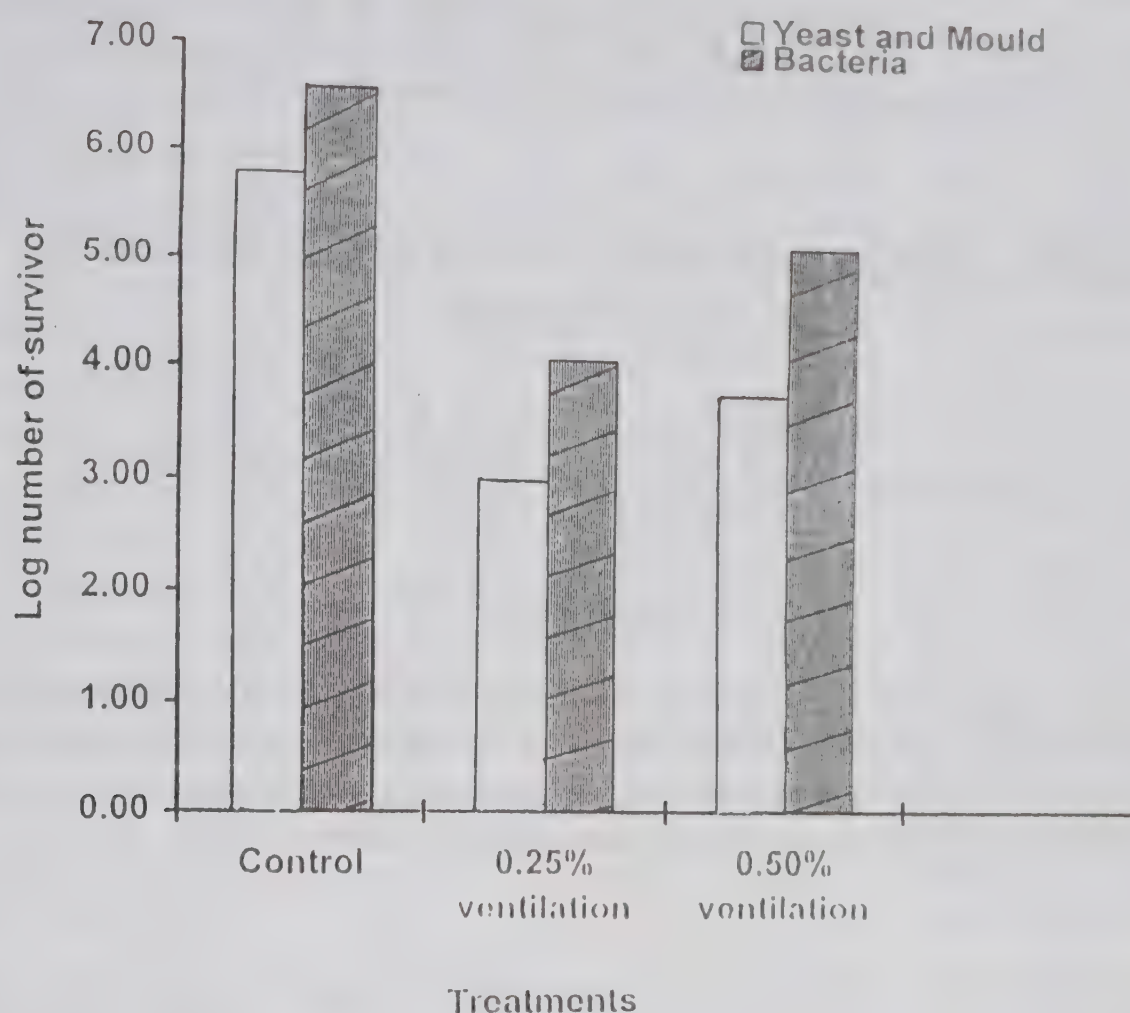


Fig.1.Effect of modified atmosphere storage on mesophilic microflora of mango fruits

OBITUARY

It is with great regret that we have learnt of the said demise of Shri Daryanomal Jani, who passed away on 20th September 2000 at Nagpur. He was an active member of AIFPA. He was taking a lot of interest in the activities of Nagpur Chapter of the Association. In his death, the Association has lost a very dynamic promoter and an important member of the Association.

AIFPA family deeply condoles his death and prays for the departed soul to rest in peace.

REVIEW ARTICLE

POSTHARVEST TECHNOLOGY OF POMEGRANATE FRUIT A REVIEW

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ABSTRACT

Pomegranate is mainly used for table purpose. There is a paucity of information on its utilisation for preparation of processed products. A brief review of literature pertaining to some of the postharvest aspects such as maturity indices, packaging, storage, physiology, physiological disorders during storage, pathology, processing and export of pomegranate fruit is presented here.

INTRODUCTION

Pomegranate (*Punica granatum* L.) locally known as "Anar" belonging to the family, *Punicaceae* is one of the favourite exotic fruits. It is one of the hardiest fruit plants that thrives well under arid and semi-arid climatic conditions where climates are cool and hot summers prevail. The tree, however, can adopt a wide range of agroclimatic conditions. It is deciduous in low winter temperature areas but in tropical and sub-tropical it is evergreen or partially deciduous. The fruits are sweet where the temperatures during maturity are high for a long period. Although it is highly drought resistant, it bears well under irrigated conditions also. Its cultivation is suitable on varieties of soils. It has

enjoyed a reputation for its healthy dietetic and medicinal properties. It is known to have been cultivated in the Middle East more than 5000 years ago. It has now spread to many Mediterranean countries, Southern Europe, Asia and Northern Africa. It is grown all over India from Kashmir to Tamil Nadu. In the U.S. it is confined to California. It is cultivated extensively in Spain, Morocco, Egypt, Afghanistan and Baluchistan.

In India, the area under this crop has increased substantially mainly because of the versatility, adaptability, drought resistance, low maintenance cost, steady and high yields of the crop. The most promising cultivars grown in India are Alandi, Dholka, Kabul,

Kandhari, Muskat Red, Vellodu, Canesh, G-137, Jyoti and Mridula. The cultivars of Khandhar of Pakistan, Wonderful of Israel, Mangulah of UAR, Ahmar, Aswad and Halwa of Iraq and Spanish Rubby, Early Wonderful are the high quality pomegranate cultivars in other parts of the world (Brooks and Olmo, 1982).

Maharashtra is the major pomegranate growing state in India. The area under this crop in the state is increasing at a fast rate and is estimated to be about 23,468 ha in late eighties and now increased to more than 75,000 hectares (Wasker and Garande, 1997). The seeds along with fleshy portion (arils) are dried and commercially marketed as 'Anardana', which is widely used as condiment. The products of pomegranate such as bottled juice,

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syrup and jelly are highly appreciated because of their nutritive and dessert qualities and palatability. The surface colour of fruit varies in the few commercial cultivars from yellow with a crimson cheek, to solid brownish red, and to bright red. The edible portion is bright-red pulp surrounding the individual seeds (Ryall and Pentzer, 1974). Du et al. (1975) determined anthocyanins of pomegranate. They found that pelargonidin - 3 glucoside and pelargonidin-3, 5-diglucoside, which were present in minor amounts in seed coats, were present at much higher amounts in the peel. Delphinidin-3-glucoside and delphinidin-3, 5-diglucoside were not detected in the peel, while cyanidin-3-glucoside, and cyanidin-3, 5-diglucoside were present in appreciable amounts.

Maturity indices

The fruits are ready for harvest 135-170 days after appearance of blossom. In summer, the fruit colour changes to dark yellow and dark red at maturity in winter. The fruit gives a metallic sound when tapped. The buds at the anterior end of the fruit get curved inside and become hardy and dry at maturity. Properly matured fruits are easily scratched with finger nails. Early harvesting in order to avoid cracking is one of the causes of poor quality of pomegranate in India (Hayes, 1953).

Packaging and Storage

Pomegranate fruits are susceptible to moisture loss and need to be stored at high humidity. After harvest, the fruits are graded according to size, wrapped in paper

and packed in bamboo baskets or corrugated boxes. In bulk storage, fruits are packed in layers in wooden crates, each containing about 16-18 kg of fruits. Dry grass, rice straw, or paper are used as cushioning material (Anon, 1989). The pomegranate fruits grown in the state of Maharashtra of India are graded into 4 grades, viz., Super, King, Queen and Prince. The fruits are then packed in corrugated fibre board (CFB) boxes. In a single box, 4-5 fruits of Super size, 6 fruits of King size, 9 fruits of Queen size and 12 fruits of Prince size are generally packed (Wasker, 1995, Waskar and garande, 1997).

Pomegranate fruit has better keeping quality than other tropical fruits such as mango, grape, and banana. The storage life of pomegranate is comparable to that of apple (Mukherjee, 1958). It can be stored for some months in a cool dry place and upto 6 months under cold storage. The fruits, however, may be spoiled during transit or before marketing due to rotting or development of black colour in the fruits.

Pomegranate can be best stored at low temperature and high humidity. Fruits stored at 4-5°C and 80-85% relative humidity did not undergo any shrinkage or spoilage in a few months (Mukherjee, 1958). Pentastico *et. al.* (1975) recommended relative humidity of 85-90% for storing *Kandhar* pomegranates. Storage at lower temperature results in chilling injury, characterised by discoloration and pitting of the rind, internal browning of the pith,

paleness of the flesh and increased susceptibility to decay. Storage at 10°C is satisfactory, if a postharvest fungicide is used (Elyatem and Kader, 1984). Kanwar and Thakur (1972) treated packing straw with 5% ammonium bicarbonate, ammonium chloride, diphenylamine, sodium thiosulfate and potassium meta-bisulfite or sulfur for packing pomegranates. The treatment of packing material with sulfur compounds was found to give 50% more fruit protection.

The control of relative humidity is critical in storage of pomegranate fruits. At low humidity, the skin desiccates readily and dark, hard rinds are formed. The fruits become less attractive and have reduced marketability (Lutz and Hardenburg, 1968). Storage of pomegranate fruit at 5°C or lower resulted in chilling injury to the fruits. The severity of the symptoms increased with time and temperature below 5°C (Elyatem and Kader, 1984). Segal (1981) has reported that the peel of *Wonderful* pomegranate fruit undergoes browning during storage below 14°C.

Pota *et al.* (1987) reported that pomegranate cv. *Banluang* were placed in plastic baskets, and in sealed polythene (PE) bags (0.02 mm) and held at 5°, 10° and 30°C (room temperature). The storage life of pomegranate in sealed PE bags at 10°C was extended upto 12 weeks. Pomegranate showed symptoms of chilling injury after holding at 5°C for 10 weeks when pomegranate were packed in plastic baskets and sealed PE bags were kept at room temperature. Koksai (1989) reported that pomegranate fruits

harvested and packed in the Silitke/Icel region were transported to Ankara on the same day. After antitranspirant (Plant guard) and fungicide (Thiabendazole) application, the fruits were stored at 1°, 5° or 10°C for upto 4 months. The least weight loss after 4 months storage (6.2%) occurred in fruit treated with plant guard and stored at 10°C.

Treglazova and Fatalier (1989) reported that 5 days after harvest, fruit samples from cultivars were immersed in 2, 3-4 and 4-8% CaCl_2 solution for 3 min. and then stored at 2-4°C and 85-90% RH for 110 days. CaCl_2 at the higher concentration caused serious damage while response to lower concentration varied with cultivar. Satisfactory results were shown by cultivars, *Gyulosha Rozovaya*, *Uluchahcyi Kazzake* and *Bala Myursal* treated at 4%. Prasad et al. (1993) reported that pomegranate fruit cv. *Jalore seedless*, at full ripe stage were harvested, packed in perforated polythene bag, gunny bag and were stored in refrigerator and ambient conditions for a period of 12 days. Fruits stored in refrigerator were found to be the best with the minimum (3.16%) loss in weight followed by those kept in perforated polythene bag (7.8%). Maximum (13.6%) weight loss was observed in fruits kept at ambient conditions. Shantha Krishnamurthy (1993) reported that individual shrink wrapping of pomegranate cv. *Ganesh* held at 8°C showed the maximum shelf life of 70 days as compared to 20 days with wrapping and 15 days without wrapping at 25°C.

Waskar and Garande (1998) reported that the different postharvest treatments and storage conditions had a great influence in retaining the physico-chemical constituents and reducing the wastage of pomegranate fruits. They reported that the shelf life of pomegranate fruit could be extended upto 30 days under room temperature (22.17° to 24.36°C temperature and 52 to 82% RH), 48 days in cool chamber (16.14 to 18.22°C and 85-95% RH) and 75 days in cool storage (8°C and 90 to 95% RH) when treated with waxol (12%) + carbendazim (0.1%). The wax treatment coupled with fungicidal dip is considered beneficial in extending the shelf life of pomegranate in cool chamber and cool storage.

Postharvest physiology

Pomegranate fruits had a low respiration rate and a non-climacteric respiratory pattern. They produced trace amount of C_2H_4 and showed no response to exogenous C_2H_4 treatments as measured by changes in skin colour, juice colour and composition. Both CO_2 and C_2H_4 production rates increased with temperature. The Q_{10} values for respiration were 3.4 between 0 and 10°C, 3.0 between 10 and 20°C, and 2.3 between 20 and 30°C. Storage at <5°C resulted in chilling injury symptoms, which become more visible after transfer to 20°C for 3 days, included brown discoloration of the skin, surface pitting, and increased susceptibility to decay organisms. Internal symptoms were manifested as pale colour of the arils (locular septa).

Fruits held at 5°C for 8 weeks showed only a slight brown discoloration of the locular septa (Elyatem and Kader, 1984).

Physiological disorders during storage

When the physiological disorder known as 'internal break-down' occurs in the pomegranate, the pulp-bearing seeds (arils) do not develop the typical red colour and are somewhat flattened than plump. Flavor of the arils is abnormal and many have a streaked appearance due to fine white lines radiating from the seeds. There are no external symptoms. The cause of the disorder is not known; it originates during growth in some seasons, usually only in limited areas (Ryall and Pentzer, 1974).

A superficial browning disorder (scald) develops on the husk of *Wonderful* pomegranate fruit during storage. The severity of this disorder could be diminished by delaying the harvest time and by reducing storage temperature, but these 2 measures were insufficiently effective for storage period exceeding 6 weeks, and at a temperature of 6°C or lower, chilling injury also occurred. Scald incidence was correlated with the amount of 0-dihydroxyphenols extractable from the husk, and was significantly controlled by measures that inhibited their oxidation by polyphenol oxidase. Such postharvest measures included dipping the fruit in boiling water for 2 min and in antioxidant solutions, in bisdithiocarbamate-containing maneb for 30 seconds, or storing the fruit in a low- O_2 atm.

The most effective control of husk scald was obtained by storing late harvested fruit at 2°C. However, this treatment resulted in accumulation of ethanol, which caused off-flavour development. When the fruits were transferred to air at 20°C, ethanol and off-flavours dissipated (Ben-Arie and Or, 1986).

Khodade (1987) reported the incidence of internal break-down of crops after 150 days of anthesis in G-137 and its intensity increases if the fruits are left on the tree upto 165 days. He also noted that the incidence of browning increased with increase in weight of fruit from 150 to 200 g (26.60%) to more than 350 g (60%). Prabhu-Desai (1989) reported that TSS, acidity, ascorbic acid, total sugars, reducing sugars, calcium, phosphorus and the enzyme catalase were low whereas non-reducing sugars, starch, tannins, nitrogen, potassium, magnesium, boron, polyphenol oxidase and peroxidase enzymes were high in affected arils of *Ganesh* and *P-23* cvs. than the healthy ones.

Postharvest pathology

Three major diseases of pomegranate caused by micro-organisms are gray mold rot, heart rot, and *Penicillium* rot. Gray mold rot is caused by *Botrytis scinaria*. Decay usually starts at the calyx. As it progresses, the skin becomes light brown, tough and leathery. The pulp-bearing seeds disintegrate into a dark mass in advanced infections. Under moist conditions, typical gray mycelium appears on the affected surface (Ryall and Pentzer, 1974).

Heart rot is caused by *Aspergillus niger* and *Alternaria* sp. Affected fruits show a slight abnormal skin colour but internally a mass of blackened arils. Usually, there is a black line of decay extending from the calyx into the fruit interior. The disease develops while the fruit is on the tree. Affected fruits can usually be detected by sorters and eliminated from the commercial pack.

Penicillium rot, caused by *P. expansum* and other *Penicillium* sp. produces watery areas at the infection site followed by masses of blue or green spores. Infections invariably occur at skin breaks caused by cracking, mechanical injuries, or insect punctures. Other fungi may infect the same injured area and eventually overgrow the *Penicillium*. Other causes of decay in pomegranate fruit includes species of *Botrytis*, *cladosporium*, *Phomopsis*, *Rhizopus* sp. and *Sphaceloma punicae* (Sonawane et al., 1986). Padule and Keskar (1988) reported that postharvest losses in pomegranate are primarily due to the weight losses in peel tissues. *Aspergillus niger* and *Aspergillus* sp. (green pigments) were not observed in the treatment with Topsin (0.1%), Bavistin (0.05 to 0.1%) and dipping inhibited the growth of *Aspergillus niger* and *Aspergillus* spp.

Contamination of pomegranates with *P. reticulosum* causes inner parts to develop grey-green spore masses without any visible external signs. The possible toxicity of metabolic products of this fungus were investigated using *Paramecium*

caudatum and white mice. Results showed that fungal metabolites caused death of *P. caudatum* within 3-20 min and of white mice within 3-7 days after oral administration. *P. reticulosum* Birkinshaw has not been known previously as a producer of mycotoxins (Osipyan and Batikyan (1983).

Rotting of large numbers of pomegranate fruits was noted during a survey of fruit markets of Rajasthan. The rot, due to *Alternaria solani*, causes damage during storage and transit. Only injured fruits developed typical symptoms (Vyas and Panwar, 1976). Application of fungicides coupled with wax had shown highly significant results in respect of control of fungal infection. The pathogens responsible for spoilage of fruits at room temperature were found to be *Alternaria* spp., *Aspergillus niger* and *Macrophomina* spp. (Wasker et al., 1988) while in cool chamber and cool storage *Penicillium* spp. and *Aspergillus niger* (Wasker et al., 1998 and Waskar and Garande, 1998) were identified. However, it is interesting to note that the fruits treated with waxol + carbendazim (0.1%) and waxol + captan (0.2%) completely controlled the attack of these micro-organisms which were found to be responsible for spoilage.

Processing

Gabbasova and Abdurazakova (1969) reported that the chemical composition of pomegranate juice includes the following ranges for fresh juice, titratable acidity (as citric acid) 0.52 to 1.6%, sugars 15.2 to 20.5%, pectin 0.05% to 1.2%,

ascorbic acid 3.3 to 6.4 mg/100 ml and vitamin B 0.03 to 0.08 mg/100 ml of juice. Iozzi (1969) used the pomegranate juice in the manufacture of carbonated and other soft drinks in the USSR. The soft drinks are also prepared from pomegranate juice (Benk, 1970). Bohnsack (1972) used the pomegranate juice flavour for preparation of confectionery products. Ney (1973) prepared a syrup from pomegranate fruit by adding 20 ml of red pomegranate extracts to 11 ml of sugar syrup. Phadnis (1974) reported that the pomegranate fruits could be successfully used for the preparation of juice-based beverages and for dessert purpose.

Zimmerman and Wengersky (1981) had designed a machine for extraction of juice from pomegranate fruit. The juice receptacles surrounding the seeds inside the fruit are burst open and released. The juice and salts are then strained from the residue through a screen. The whole operation is automatic and the juice obtained is subsequently used to prepare lemonade, cordials, syrup etc. Stability of pomegranate juice colour under thermal process conditions such as pasteurization or dehydration was studied by heating samples of juice or juice diluted with water for various times at 70-92°C and then determining the absorbance at 510 nm as a measure of the colour. Colour was very stable to heat treatment. Colour stability was greater in undiluted juice than in diluted juice (Mishkin and Saguy, 1982).

Surbnshanyan (1983) described

an equipment for separating seeds from pomegranate skin; the seeds are then pressed for juice extraction, the juice being used in the manufacture of beverages, as natural pomegranate juice or a food additive. A technology for obtaining canned pomegranate beverage is described with particular reference to juice clarification tests using different adsorbents (askangel, gelatin, mild charcoal, casein, bentonite). Bentonite had a good clarification effect but the colour intensity decreased by 35-42%. From sensory and chemical viewpoints, bentonite and gelatin at 1.00 to 1.50 g/litre of juice, gave good results (Gabuniya *et al.*, 1984). Pruthi and Saxena (1984) reported the procedure for preparation of *Anardana* from pomegranate.

Gabuniya *et al.* (1985) reported the recipes and methods for production of canned products (sauce and puree) from the waste (seeds, peel, membranes) remaining after pomegranate juice production. Change of colour of pomegranate juice during storage at room temperature were recorded and the effective stabilisation of juice with PVP (Polyvinylpyrrolidone) and trypsin was compared with juices stabilised with bentonite and gelatin. Results showed that treatment of juice with PVP and trypsin prevented formation of precipitates and that the colour stabilised more effectively than in juices treated by bentonite and gelatin (Khrameeva *et al.*, 1987).

Adsule *et al.* (1992) reported that a good quality wine can be successfully prepared from

pomegranate juice. The sensory evaluation studies showed that pomegranate wine had better flavour and colour than grape wine. Waskar and Deshmukh (1994) reported that the juice extraction method using crushed pomegranate arils and heating at 40°C gave maximum juice recovery (60.21%) with an adequate quantity of anthocyanins, sugars and comparatively lower tannins, and it recorded the highest score during organoleptic evaluation.

The pomegranate juice (cv. *Ganesh*) was packed in colourless and amber colour glass bottles and stored at room temperature (29.5 to 21.43°C) and low temperature (5°C). It was found that after the storage period of 180 days there was maximum retention of anthocyanins (30-70 mg per cent) in pomegranate juice packed in amber colour glass bottles and stored at low temperature (Waskar and Deshmukh, 1995).

Waskar and Garande (1998) reported that the blending of pomegranate and kokum juice in 80% + 20% gave good TSS, acidity and anthocyanins. This combination rated the highest organoleptic score. It was also observed that with the addition of kokum juice in pomegranate juice, the TSS of resultant blend was found to be decreased with an increase in acidity. However, there was a substantial increase in anthocyanin content of blended juice.

Export : Considering the high keeping quality and availability throughout the year, India has

great potential for export of pomegranate fruit. The commercial variety 'Ganesh' is quite superior in quality and suitable for export market. Some Gulf countries like Saudi Arabia, Qatar and Kuwait and Bangladesh are major importing countries of Indian pomegranate. During the year 1992-93, a total quantity of 17,903 metric tonnes of fruit valued at Rs. 215.60 lakh was exported from India (Waskar and Garande, 1997).

CONCLUSIONS

Pomegranate is commercially grown in Maharashtra and Karnataka States. However, it is necessary to develop a technique for extension of shelf life for export markets by using irradiation technique and shrink wrapping. The technology for preparation and storage of frozen arils needs to be paid attention. The process of preparation and storage of *anardana* needs to be standardized.

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Founder Editor of "Indian Food Packer" is no more

It is with great regret that we have learnt of the sad demise of Shri Kailash Nath, founder Editor & Publisher of "*Indian Food Packer*" who died in Delhi on 7.10.200. He was MD of M/s Harnarain Gopinath. He had led an Indian Delegation to the International Fruit Preservers' Congress at Paris (France) in 1954 and was founder Director of Processed Food Export Promotion Council of India, Ministry of Commerce, Govt. of India-1961.



Shri Kailash Nath was born on October 12, 1922. Shri Nath had endeared himself to many in the AIFPA. In his death the Industry has lost a very dynamic personality of the Association.

AIFPA pays homage and prays for the departed soul to rest in peace.

GENERAL ARTICLE

Too Many Odds Against Food Processing Sector

by Ramnath Subbu

The food processing industry was touted to be a sunrise industry for India some years ago and on the face of it, there was little reason to doubt that. India has an advantage in food processing because of the varied agro-climatic conditions and availability of raw materials. However, much to everyone's disappointment, this industry faced a negative growth of five per cent in the last two years while it witnessed a 20 per cent growth between 1991 and 1998 following liberalisation of the sector.

In the last two years, the growth trend turned negative mainly attributed to high taxation - currently, average tax incidence (indirect taxes) on the industry is 25 percent. The Approach Paper to formulation of a national Policy for food processing industries prepared by the Department of Food Processing Industries, Union Ministry of Agriculture, has identified tax levels on processed foods in India as being among the highest in the world. Multiple and complicated tax regimes have made the industry uncompetitive.

The paper points out that the annual turnover of the industry is estimated at Rs. 144,000 crores of which Rs. 111,200 crores is in the

unorganised sector. The processed food sector provides for a high index of employment. According to the paper, for every Rs. 1,000 crores invested in food processing, the sector generated for 39,000 persons as compared to 31,300 in the textile sector and 22,300 in the paper industry.

The sector has been characterised by poor marketing, transport and communication

and vegetables that is wasted and this is the one that mostly undergoes processing.

Addressing a recent workshop organised by the Federation of Indian Chambers of Commerce and Industry (FICCI), along with the Confederation of Indian Food Trade and Industry (CIFTI) on issues concerning the industry, Mr. Rajeev Bakshi, managing director, Cadbury's India, said, "About 80

per cent of the food processing industry is based on agro inputs. In India, 55 per cent of household expenditure is on food and the value addition to food fortification is only 7 per cent as compared to 45 per cent in the Philippines, 23 per cent in China and 188 per cent in the U.K" The CIFTI points out that as many as 12 different ministries and departments govern and administer the agricultural and agro based sectors in India. Their tasks and responsibilities

overlap in several key areas.

Mr. Harsh Mariwala, chairman, FICCI committee on non-durable consumer goods and chairman and managing director, Marico Industries, said, "The food processing industry has significant linkages between agriculture and industry and it supports other industries such as packaging and

- Low productivity of raw materials leading to high unit price of final Product.
- Lack of storage infrastructure leading to wastage and increasing unit price of the finally available quantity.
- Lack of proper linkage between industry and farm, forcing industry to procure raw materials from the open market, a feature unique to Indian food processing industry.
- High cost and non availability of finance
- High operating cost due to multiplicity of law and regulations.
- High incidence of taxes and duties on final products.

infrastructure There is a lack of integration of local markets with national and international markets to support faster and more diversified growth, according to the paper.

Besides, wastage of fruits and vegetables is as high as 39 per cent. It is the non-table variety of fruits

printing. It also has a strong rural bias. The industry is expected to double in size over the next five years."

Mr. Mariwala felt that investments were low and because of the tax structure and overlegislation, it is unattractive to large enterprises. He said the industry is caught in a vicious circle at present. Low investment and weak infrastructure have led to the emergence of a huge unorganised sector while high taxes and low productivity have led to high costs and low demand in the organised sector. Touching upon the dangers of a large unorganised sector in the industry, Mr. Mariwala said the dropsy crisis in mustard oil in north India two years ago was a clear example. Mr. Bakshi felt most business models of multinationals based on western experiences will not succeed here. "There should be appropriate technology developed for the local market." He said there is an increasing trend of multinational companies importing their products rather than producing here as they find it much more cost effective.

In response to the industry's woes, the Government is likely to introduce the Processed Food

Development Act in the winter session of Parliament, according to Mr. Omesh Saigal, Secretary, Department of Food Processing Industries. The new policy aims to create an enabling environment, look into infrastructure development, and backward and forward linkages. The main object is to create a single authority to administer all the food laws.

Mr. Chaoba Singh, Union Minister of State for Food Processing Industries, while addressing the workshop, said the Processed Food Development Act will cover not only food laws but also creation of a development fund, equalisation fund, futures market, compulsory standards in line with Codex [General Agreement of Tariffs and Trade (GATT) proposals, support harmonisation of food safety standards set by Codex Alimentarius Commission, a United Nations organisation funded by the World Health Organisation (WHO) and Food and Agricultural Organisation (FAO)].

It will also take into consideration standardisation which will be defined so as to include imported goods. The new Act will include provisions of the

Agricultural Produce Grading and Marketing Act (AGMARK), Standards of Weights and Measures Rules and Export (Quality Control & Inspection) Act. The Act will contain provision, for granting incentives to merit based processed foods and will define merit goods and futures trading.

The effort of the Government is to evolve a nationwide model which will ensure a pro-active, industry-oriented approach to enable the industry to grow in a modern, scientific and well planned manner.

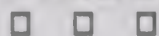
Mr. Saigal said the Prevention of Food Adulteration Act (PFA) of 1954 was hindering the growth of the food processing industry. The PFA Act, Fruits Products Order, Meat Products Order, Milk and Milk Products Order will be covered under the new Act and render the provisions in the Essential Commodities Act, 1954 redundant.

The first draft of the bill will most likely be finalised by the end of September after discussions with industry and government participants. But the draft bill will require approval of the Union Cabinet before being introduced in Parliament.

PLACEMENTS SOUGHT

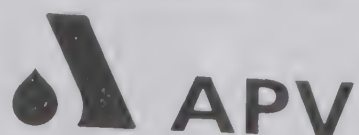
Mr. Dinesh C. Pandey, is a Postgraduate in Fruit Technology and P.G. Diploma in Food Analysis and Quality Assurance. He has 6 1/2 years of working experience in different Food Industries. Now he seeks new challenging position in Food Industry.

He may be contacted at:- M. Dinesh C. Pandey, C/o Mr. S. C. Balodi, E-323, Sewa Nagar, New Delhi-110003 Tel:- 011-4642555.



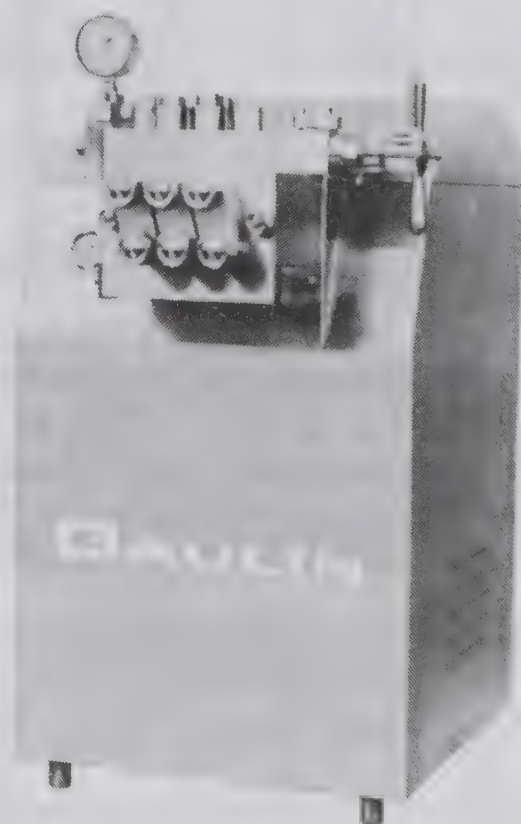
Mr. Vinay Kumar Mishra is a B.Sc., and Postgraduate Associateship in (Fruit & Vegetable Processing) having 8 years working experience of handling of preservation and processing of various Fruits & Vegetables and their products and specialization in Canned & Bottled Products like Sauce, Jams, Pickles, Juice, Canned Fruits and Vegetables. At present he is working as a Senior Food Technologist and now seeks a new challenging position as a Manager (Production) in any reputed organisation.

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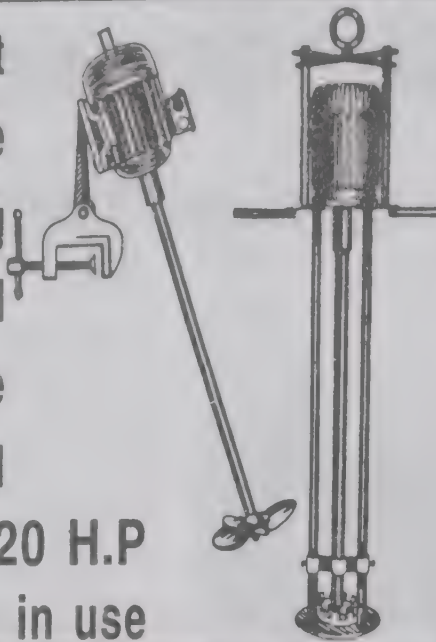
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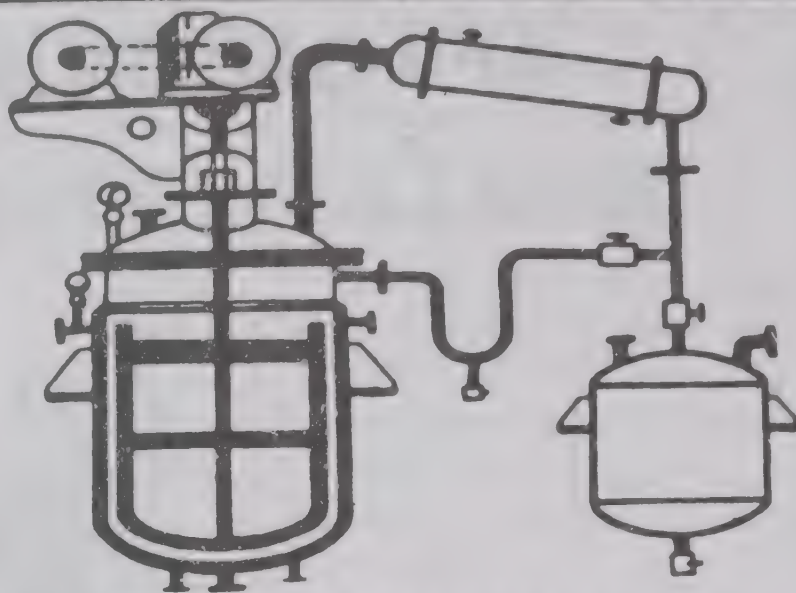
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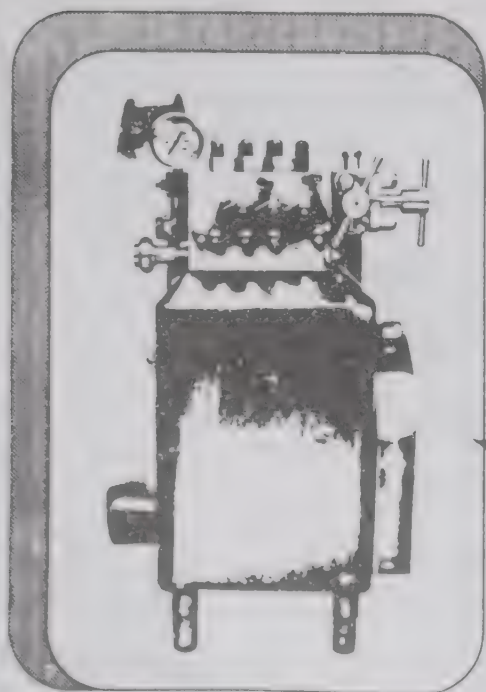
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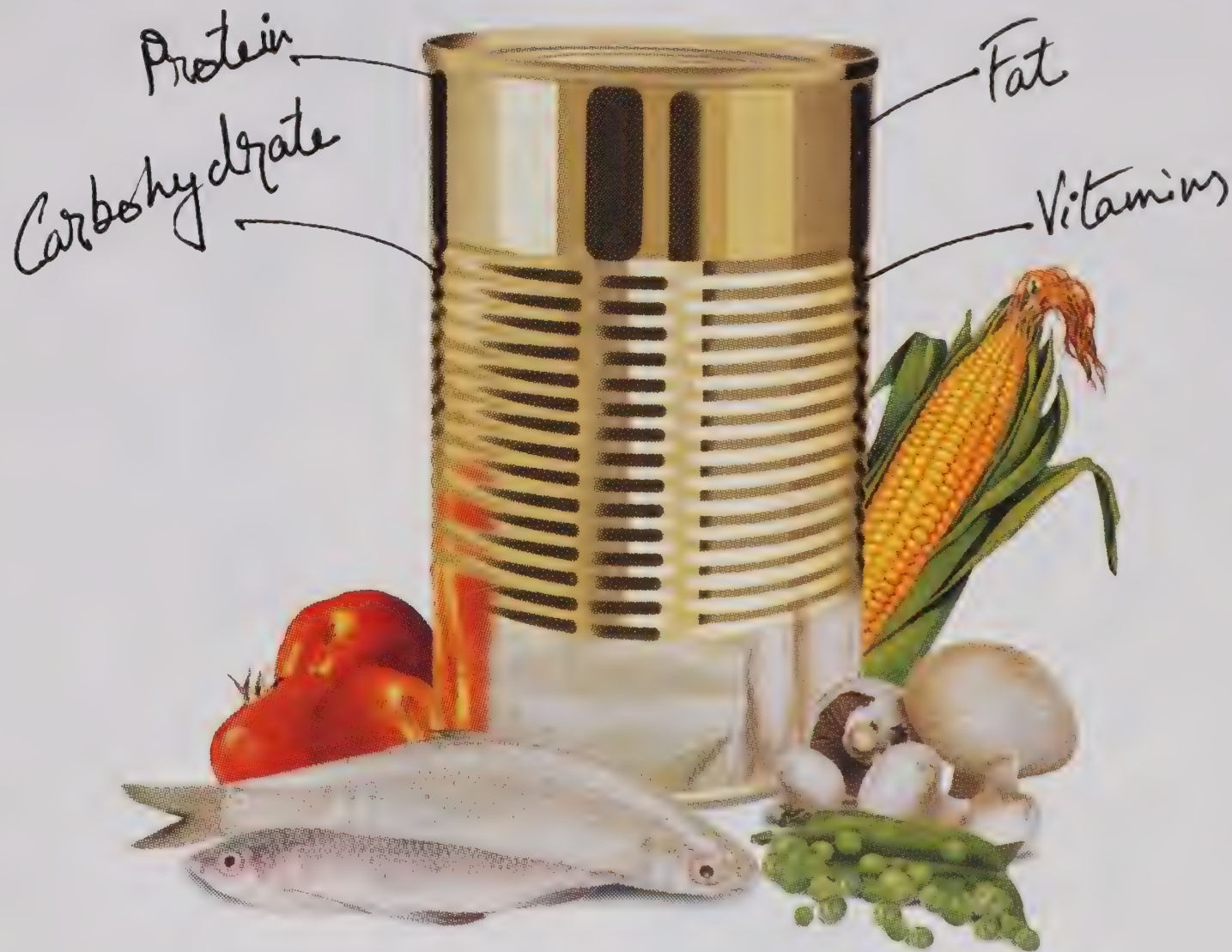
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Journal of the All India Food
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Removal of QRs on imports-challenges ahead

India is a signatory to the WTO agreement on trade and from 1st April 2001, some of the remaining quantitative restrictions on import of goods into India will also be removed. Consequent to this, imports of all products including agrifoods/processed foods will be free to enter into our country. They will no doubt be subjected to certain customs tariffs but the floodgates will open, posing great challenges to the indigenous industry. So far, even without substantial imports of food products into India, the market for local processed foods has been low due to high excise levy and sales taxes and high packaging and distribution costs. When the excise levies had been totally removed on processed fruit and vegetable products, this industry increased its production by over 20% but with the reintroduction of excise duty a couple of years ago and the recent hike in sales tax, there has been a negative growth in the local industry with attendant problems of unemployment and unviability of the Units.

Removal of Quantitative Restrictions from April 2001 would mean that a member of countries would be trying to dump their processed foods in the Indian market, thereby adversely affecting the sale of indigenous products. The processed food industry might also face closure of many of its units, further aggravating the situation. The Govt. of India will have to come to the rescue by increasing import duties and taking antidumping measures. In the long run, however, the industry will have to gear itself up to face the competition by improving its productivity in all aspects and raise the quality of the products to match international standards. To help achieve the latter objective, Govt. should allow the use of well tested and internationally approved food additives in the manufacture of processed foods in India.

The Union Dept. of Food Processing Industries has recently proposed a 10 year tax holiday, which if accepted by the Ministry of Finance would go a long way in making the indigenous processed food products very competitive in the market and help in increasing the consumer demand. Our products will also be able to stand competition in the international market and bring more foreign exchange to the country.

The Food Processing Industry will be eagerly waiting for the forthcoming Union Budget proposals and hopes it will bring some cheer.

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56th ANNUAL CONFERENCE & AGM

AND

NATIONAL SEMINAR

ON

**FOOD PROCESSING & NATIONAL
OBJECTIVES-CHALLENGES IN THE NEW
TRADE ORDER**

ASSOCIATION NEWS

56th AGM and Annual Conference and National Seminar on "Food Processing & National Objectives - Challenges in the New Trade Order".

The above Conference and National Seminar Organised by AIFPA was held on 21st Dec. 2001 at New Delhi. Sh. Gokul Patnaik, President of AIFPA welcomed the Hon'ble Minister, the Secretary and other guests and also the participants to the conference. It was inaugurated by the Hon'ble Union Minister for Food Processing Industries, Sh. T.H. Chaoba Singh. The keynote address was given by Sh. Omesh Saigal, Secretary, Department of Food Processing Industries, Govt. of India. Their speeches have been printed in the following pages.

Several awards of the Association, viz, Kashalkar Memorial Award, S.K.Mitra

Memorial Award, Subhkaran Jatia Memorial Award, President's Award and the different Indian Food Packer Awards were presented to the selected personalities at the conference.

After the tea break, the technical session followed, which was presided over by Dr. (Mrs.) Vibha Puri Das, Joint Secretary in the Department of Food Processing Industries., Govt. of India. Papers were presented on the theme of the seminar by three speakers viz, Dr. V. Prakash, Director, CFTRI, Mysore; Sh. Abiram Seth, Executive Director, Pepsi Foods Ltd., and Dr. S. K. Roy, Scientist (Emeritus), IARI, New Delhi. Representative of APEDA gave a video presentation

on the website created by them on Food Industry. A lively discussion followed during which several important points were raised by the delegates and the same were clarified by the speakers. The Chairperson, Smt. Vibha Puri Das reviewed the presentations and the discussion and wound up the session with her concluding remarks.

The participants adjourned for lunch.

After lunch, the business session of the AGM of the Association was held. Sh. Gokul Patnaik & Dr. S. Jindal were unanimously elected to continue as President & Vice-President respectively for the next year.

ADDRESS OF SHIR TH. CHAOBA SINGH, HON'BLE MINISTER OF STATE FOR FOOD PROCESSING INDUSTRIES, ON THE OCCASION OF SEMINAR ON FOOD PROCESSING AND NATIONAL OBJECTIVES-CHALLENGES IN THE NEW TRADE ORDER, ORGANIZED BY THE ALL INDIA FOOD PROCESSORS' ASSOCIATION ON 21ST DECEMBER, 2000

I am happy to be here on the occasion of the Seminar on Food Processing and National Objectives - Challenges in the New Trade Order, being organized by the All India Food Processors' Association.

As you are all aware, food processing is very important for India's development because of the vital linkages and synergies that it promotes between the two pillars of our economy, namely, industry and agriculture. Fast growth in the food processing sector and progressive improvement in the value addition chain are also of great importance for achieving favourable terms of trade for Indian agriculture both in the domestic and international markets. Even more important is the crucial contribution that an efficient food processing industry could make in the nation's food security.

Unlike other sectors such as IT and agriculture, there is no national policy for the food processing sector at present. Government has already prepared details. Four Regional Seminars and a National Seminar have been held to obtain the reaction of the State Governments,

R & D Institutions, planners, farmers, NGOs and cooperatives. The Food Processing Policy is in the final stages of formulation. This would cover planned action on all aspects relating to processed food sector in the country.

As all of you are aware, the value addition in India is 7% whereas in UK it is 88%. The implications of low addition are un-remunerative prices to farmers and high price to consumers. Also, there is wide fluctuation in prices combined with huge wastages.

At present, only 2% of the fruits and vegetables in our country are processed. The reasons for this low processing are: agriculture being largely for subsistence, not being driven by market forces, unsuitable variety of raw material, inequitable tax structure, low margins & high risk, poor infrastructure and lack of cold chain.

The government is proposing to increase the processing levels from 2% to 10% in the next 10 years. This will need an investment of Rs.1,40,000 crores. This will

lead to increase in value addition from 7% to 35%, generate employment of 3 crore persons, save losses by Rs. 10,000 crores per annum and increase GNP by 7%.

I am aware about the adverse effect on the growth of the processed food sector as a result of imposition of the excise duties. Last year we had recommended zero per cent duty on the processed food sector. I propose to pursue this matter vigorously with the Finance Minister. In fact, we in the Department feel that high taxation rate and the multiplicity of laws and implementing agencies are the two factors which are responsible for the present state of processed food sector.

At present, we have multiplicity of Acts, which are retarding the growth of the processed food sector. It is also proposed to enact a Processed Food Development Act. The nature of the Act will be developmental rather than regulatory. The proposed Act, inter alia, envisages defining standards for uniform & universal application, defining merit goods for incentives,

creation of development fund dedicated to FPI, creation of equalization fund as cushion for price fluctuations. It also incorporates future trading and new technologies in packaging, processing, fortification etc.

With the coming into force of the WTO Agreement and likely removal of all restriction on import of food products, the domestic industry has already started facing competition from the imported goods. The only way for the domestic industry to succeed is

quality at affordable prices. The industry has to gear up and convert the challenge into opportunities.

With globalization, the industry associations in general and All India Food Processors' Association in particular, have a unique responsibility towards the development of the industry and also to assist Government in formulating long term policies. The association is an inextricable link between the industry and Government and interface will

help the industry in achieving the goals and objectives for meeting the domestic as well as global challenges.

The Government and the All India Food Processors' Association continue to have a close interaction on issues relating to the industry and I can assure you that whenever any issue is posed to the Government, it will be taken up with appropriate authorities.

I wish the organizers a great success.

BEC FOODS GETS ISO-9002 CERTIFICATE.

M/s. BEC Foods, who are an active member of A.I.F.P.A. have now been awarded an ISO-9002 Certificate by the certification body, TUV. The company has established and applies a quality system for manufacturing of fruits and vegetable pulps, concentrates, juices, puree and pastes. The company already had necessary licence under FPO and certificates awarded by KOSHER of Israel and SGS of Germany.

KEYNOTE ADDRESS OF SHRI OMESH SAIGAL, SECRETARY, DEPARTMENT OF FOOD PROCESSING INDUSTRIES, AT THE NATIONAL SEMINAR ON FOOD PROCESSING AND NATIONAL OBJECTIVES - CHALLENGES IN THE NEW TRADE ORDER, ORGANIZED BY THE ALL INDIA FOOD PROCESSORS' ASSOCIATION ON 21ST DECEMBER 2000 AT NEW DELHI

I am happy to be here today at this National seminar on food processing and National objectives-challenges in the new trade order, being organized by the All India Food Processors' Association. I wish to compliment the Association for organising this seminar as it gives us all an opportunity to discuss some of the concerns, which the Indian food processing sector has to address, in the changing scenario. I am sure the seminar will have an overview of the current global situation including the evaluation of emerging trends in this sector.

India is one of the largest producers of fruits and vegetables and one of the leading producers of poultry products and dairy products. We can definitely step up the volume of our exports substantially given the right conditions, greater awareness and attention to quality and safety issues.

As per our commitment under WTO, all the Quantitative Restrictions (QRs) on import of goods have to be removed from 31st March 2001. As a matter of fact, these are being phased out every year. The large size of the Indian market has proved to be a lucrative target for foreign producers of processed foods. The liberalization of industrial policy and investment

procedures have helped in bringing in substantial foreign investment, as well as state of the art technologies in the processed food sector. Most of the major multinational companies dealing in processed food have already moved in. The integration of Indian economy with global economy is now an irreversible process.

As a member of WTO, India has an obligation to implement and administer the provisions of two agreements, namely, the agreement on Technical Barriers to Trade and Sanitary & Phyto Sanitary measures. These agreements place an obligation on nations to ensure that the technical regulations have a scientific justification, do not arbitrarily or unjustifiably discriminate between nations, are not applied in a manner that would constitute a disguised restriction on trade, are not more restrictive to provide appropriate level of protection and are established and maintained in an open and transparent manner.

The key to India's success in agro exports shall be quality. There is a perception that while GATT Agreements seemingly provide unrestricted market access, in practice, the access to markets of developed countries is indirectly denied through non-tariff barriers

such as high-quality standards, specifications etc.

The concept of quality assurance has alluded the Indian exporters so far. Accustomed to the domestic market, quality has never been the Indian manufacturer's priority. It is landing Indian products into difficulty. Not only does the poor quality stuff fetches lower realisation but it also sillies the country's image. Total quality management begins not only from first stage of manufacturing of the end product but from stage one of production of the raw material.

Globalization of trade will also call for harmonization of food standards. Under the WTO arrangements, we cannot stop the inflow of products from other countries just by imposing legal regulations. Every policy measure would have to be justified on socio-economic and scientific grounds. Therefore we must work towards establishing and upgrading international arrangements and mechanism relating to technical information, standardization, quality assurance, inspection, testing, certification and accreditation. It will facilitate trade to the extent that each country will not need to modify their exports to suit different standards of various countries. This will reduce costs on

many accounts and would help in improving India's competitiveness in global trade as well as ensure consumer confidence in the domestic markets.

Movement towards harmonization of national and international regulatory systems can offer Indian consumer greater choice of goods at more competitive prices. This will also call for building up of strong national systems for certification and inspection both for exports and for imports. Emphasis has to be given to HACCP and ISO.

The process of globalization has also opened up new possibilities for increasing our share in international trade of processed food products. Right now, our share is very low, which can be increased considerably if the food processing industry rises to the challenge of technology upgradation quality management, firm adherence to export commitments and acquisition

of appropriate negotiation skills. My plea to the industry is to gear up and equip themselves to meet these challenges and cash the opportunities arising out of WTO agreements.

The Government has several schemes of financial assistance for development of infrastructure, technology upgradation, quality management and other promotional activities. I call upon the industry to make liberal use of these schemes.

Unlike other sectors such as IT, agriculture, presently there is no national policy for the food processing sector. Government has already circulated approach paper. Four Regional Seminars and a National Seminar have been held to obtain the reaction of the State Governments, R & D Institutions, planners, farmers, NGOs and cooperatives. The Food Processing Policy is in the final stages of formulation. This would cover

planned action on all aspects relating to processed food sector in the country.

At present, we have multiplicity of Acts, which are retarding the growth of the processed food sector. It is proposed to enact a Processed Food Development Act. The nature of the Act will be developmental rather than regulatory. The proposed Act envisages; defining standards - uniform & universal application, defining merit goods for incentives, development fund creation dedicated to FPI, equalization fund - cushion for price fluctuations, futures trading and new technologies in packaging, processing, fortification etc.

I congratulate the winners of several awards for the excellent work done by them. I am sure that they will continue to contribute for the betterment of the industry. I also congratulate the Association for the excellent work being done by them.

Industry delegation to visit New Zealand in the first week of April - 2001

The Union Minister of State for Food Processing Industries will be visiting New Zealand in the 1st week of April - 2001 to explore possibilities for cooperation in Food Processing Sector in general and milk processing, fruit & vegetable processing and modern abattoirs in particular. The delegation will comprise of Government officials and Industry/trade representatives.

Members of AIFPA interested in joining the delegation may send their names and details of interest immediately to AIFPA's Office to enable us to forward the same to the Govt.

It may incidentally be mentioned that the expenditure on the visit to New Zealand will have to be met by the members themselves.

Presentation of Awards

KASHALKAR MEMORIAL AWARD - 1999

The Kashalkar Memorial Award was introduced by the Association in 1962 in the name of Shri Y. Kashalkar, a pioneer in Food Processing Industries in India.

This year's award goes to Pepsi Foods Ltd., for their contribution in developing raw materials of processing variety and quality for food processing industries. Industry has recognised these efforts of Pepsi Foods Ltd.

Efforts are directionless, unless men behind devotedly achieves objectives set for themselves. The credit therefore goes to the management and staff headed by Shri P.M.Sinha who joined as President and Chairman of Pepsi Foods Ltd. in 1992. Earlier Mr. Sinha worked on the Board of Directors of Hindustan Lever and its associated companies. He was the sales director of Hindustan Lever and then Director in charge of Corporate Affairs, Agri- Products and new businesses and Chairman of Stepan Chemicals. Prior to joining Hindustan lever Board, Mr. Sinha was on the Board of Lintas and Sharpedge.

Shri P.M.Sinha's long contribution to the Agri-business and Food processing with Pepsico has been recognised and the Kashalkar Memorial Award is conferred on

him for 1999 which carries a 10 gms Gold medal and this citation.

This award has been presented by Shri Th. Chaoba Singh, Union Minister for Food Processing Industries on this 21st Day of December, 2000, at New Delhi.



SOILENDRA KRISHNA MITRA MEMORIAL AWARD-1999

This award has been sponsored in the name of Late Sh. Soilendra Krishna Mitra, founder of Mida & Co, Calcutta in 1926 by his son Sh. S.N.Mitra.

This year's award goes to Dr. V.Prakash, Director, CFTRI, Mysore.

Dr.Prakash was born on November, 23, 1951 at Mysore and had his education at University of Mysore and got his Ph.D in 1976. During 1976 to 1980, he spent his time in USA in two major universities and worked on several aspects of enzymes and proteins with many new revolutionary concepts. Until now he has more than 125 publications in National, International Journals and more than 200 papers presented in conferences and continues to be active in his laboratory work.

After he took over as Director during 1994, the number of

projects that he has shown initiative towards projecting and synergising research and development towards industry is very large. One can see this not only from the four fold increase in Industry-CTTRI interactions but also through his role in promoting such a vast interaction, in addition to his efforts helping other institutions and other systems to interact closely with industry. As a prime mover in many of the national working committees and as head of several missions in Food Science & Technologies, including the dynamic Chairmanship of Fruit & Vegetable Technology prediction mechanism, as a chairman of Technical Advisory committee of All India Food Processors' Association and also as chairman of the sub-committee on Food Additives of CCFS, he has done yeoman service.

He is the first Food Technologist to receive the Nation's Prestigious and coveted Shanti Swarup Bhatnagar Award in 1996 for his outstanding contribution in the field of Food Science & food Technology.

In recognition of the long outstanding contribution, Dr. V.Prakash has been awarded the Soilendra Krishna Mitra Award for the year 1999 which carries 10gms Gold medal and this citation.

This award has been presented by Shri Th Chaoba Singh, Union

Minister of state for Food processing Industries, this 21st December, 2000 at New Delhi.



SUBHKARAN JATIA MEMORIAL AWARD-1999

This award has been sponsored in the name of late Shri Subhkaran Jatia by his son Shri S.K.Jatia. This award will be given to a person every year who has rendered distinguished services to the growth of food processing industries in India.

Shri S.N.Prahlad is the Chief Executive of the SNP Associates, a consultancy company established by him in 1992 specially for High Technology food processing and packaging for liquid, semi-liquid and viscous foods.

Shri Prahlad has M.Sc. in Dairy Technology and Senior Management programme from Harvard Business School.

Shri Prahlad worked as vice-president in Vulcan Laval and handled dairy, vegetable oil, Brewery, Industrial Engineering, developing tailor made designs of products suitable for Indian market with Sweden. In his assignment with Wimco Ltd. as General Manager (Technical) responsible for food division operations he set up the aseptic food processing plants in India, introduced Indian fruit concentrates and purees to the European Market.

Shri Prahlad has rendered useful services to the food processing Industries during the last more than 3 decades and enjoyed his association with professional bodies like Institute of Food Technologists (IFT), Chicago, past President and Life member, Association of Food Scientists and Technologists (AFST), Past Chairman, Centre for Processed Foods (CPF) and US Aid sponsored organisation, Agriculture Promotion Export Development Authority (APEDA), Harvard Business School Alumni etc.

In recognition of the long outstanding contribution, Shri S. N. Prahlad has been awarded Subhkaran Jatia Memorial for the year 1999 which carries a Gold Medal, Rs. 5000/- in Cash and this citation.



GANESH PRODUCTS PVT. LTD. AWARD - 1999.

Ganesh Products Pvt. Ltd., Calcutta have instituted a special Award to be given for exemplary work done with Central and State Governments for the development of Food Processing Industries.

Sh. D. S. Chadda, an eminent Food Laws expert in India whose efforts in harmonising specifications of processed fruits and vegetables under Codex, PFA and FPO has been chosen as the outstanding personality for Ganesh Products Pvt. Ltd., Calcutta award for 1999.

Sh. D. S. Chadda is M.Sc Tech (Punjab); M.Sc. (Foods, Drugs and Water, London) Food Chemistry (London University), DIC, ARIC.

As Public Analyst in Punjab, he provided guidance to food industry in analytical techniques. As Asst. Director General (PFA) and Secretary - CCFS (Ministry of Health), he responded to harmonization of food regulations with FPO (FPO Licencees exempted from licencing under PFA)

Sh. Chadda has been responsible for holding workshops/seminars to promote awareness and provide latest information in the interest of food industry in the areas of ;

- Challenges to Food industry in view of SPS & TBT Agreements under WTO and its implications to Indian Food Industry in respect of import/export of food products.
- Preparation of import rules & procedure for guidance to food industry.
- Publication of PFA Act and Rules, Packaged Commodity Rules for guidance to Food Industry every year updated with amendments.

In recognition of the long outstanding contribution, Shri D. S. Chadda has been awarded Ganesh Products Pvt. Ltd. Award for the year 1999 which carries a Silver Plate and this citation.



PRESIDENT'S SPECIAL AWARD - 1999

President's Special Award for 1999 has been conferred on Dr. S. K. Saxena, Director, Food Research and Analysis Centre, New Delhi for his outstanding contributions to the upgradation of the facilities for the food testing and quality control systems.

Dr. S. K. Saxena is highly qualified in his specialised field with Ph.D in Pesticide residues analysis in food products, M.Phil in Analytical Chemistry and M.Sc in Chemistry (Food). He is a Qualified QMS-Lead Assessor for NABL, Qualified Lead Auditor in EMS by the Environmental Auditors Registration Association U. K. based on EN: 14000., Qualified Food Safety (HACCP) Auditor by Quality Society of Australia based on CODEX.

Worked as Junior Research Fellow and subsequently promoted as SRF at Deptt. of Applied Chemistry, Aligarh Muslim University, Aligarh, India (1986-1990) and produced & published 10 research papers in the journals of international repute on Food safety, Quality Control, Analysis of food products, Pesticide residue analysis, Chromatography, Quality Management, Environment Management, Food Processing, Water & effluent treatment etc.

Dr. Saxena has contributed two chapters in the recently published "Handbook of Food Analysis, Vol.

2" edited by Dr. Leo M. L. Nollet, Marcel Dekker Inc. New York,

Besides, Dr. Saxena has numerous publications to his credit.

His is young and in his running of the laboratory of FRAC, he has contributed significantly for the growth of the Food Processing Industries.

Dr. Saxena has been presented the Silver plate and this citation on 21st Dec., 2000 by Shri Th. Chaoba Singh, Hon'ble Union Minister of State for Food Processing Industries.



"INDIAN FOOD PACKER" AWARDS-1999

As in previous years, Awards were given to different categories of research/review articles published in "*Indian Food Packer*" during 1999. In all, 35 articles were published in "*Indian Food Packer*" during 1999 which were assessed by a Committee with Shri K. L. Radhakrishnan, Chief Editor as Chairman and Dr. J. S. Pruthi, Dr. A. K. Bhatia and Dr. M. M. Krishna as Members. Based on their recommendation, the following Awards were given :

K. U. PATEL MEMORIAL AWARD - 1999.

The K. U. Patel Memorial Award Instituted in 1971 by M/s Tims Products Ltd., Calcutta, is being given annually for the

"Overall Best Paper" published in the "*Indian Food Packer*" during the calendar year. The Award carries a sum of Rs. 2000/- and a citation.

The K.U.Patel Memorial Award for 1999 is given to the paper entitled "Thermal Processing of Sapota" authored by A.R.Rege and J.S.Pai of the Department of Chemical Technology, University of Mumbai, Matunga, Mumbai published in the July-August 1999 issue of the "*Indian Food Packer*"

While adjudging the paper as "Overall Best paper" the Panel has observed that sapota is emerging as an important horticultural produce of Western & Southern India with excellent possibilities of value addition by suitable processing. Sapota is now least processed because of undesirable changes in colour, flavour and taste when subjected to heat due to the presence of leucoanthocyanins in the fruit. The above study by Rege and Pai opens up opportunities for utilising this important resource for making value added products, which can fetch better returns to the producers. Quality of work reported is highly commended.



N.N.MOHAN MEMORIAL AWARD-1999

The N.N.Mohan Memorial Award, instituted in 1976 by M/s. Mohan Meakins Ltd. Ghaziabad is being given annually for the "Best Research Paper"

published in the "*Indian Food Packer*" during the calendar year. The Award carries a sum of the Rs.2000/- and a citation.

The N.N.Mohan Memorial Award for 1999 is given to the paper entitled "Osmotic concentration kinetics of amla preserve" authored by M.Singh, U.S.Shivhare, H.Singh and A.S.Bawa of Guru Nanak Dev University, Amritsar, published in the January-February-1999 issue of the "*Indian Food Packer*".

While adjudging the paper as "Best Research Paper", the Panel has observed that amla is the richest source of Vitamin C and is associated with many therapeutic beliefs in Ayurveda, the Indian system of medicine. It is one of the oldest fruits preserved in the form of *murabba*. The authors have worked out the kinetics of moisture and sugar transfer as a function of concentration during *murabba* making. The temperature of sugar solution and other changes have been studied. They have also developed a mathematical model to describe the adequacy of the process. It is a laudable effort to link the traditional practices with scientific tenability.



N.A.PANDIT AWARD-1999

The N.A.Pandit Award instituted in 1981 by Shri Narayan Anant Pandit, Mumbai, is being given annually for the "Best Review Paper" published in the "*Indian*

Food Packer" during the calendar year. The Award carries a sum of Rs. 2000/- and a citation.

The N.A.Pandit Award for 1999 is given to the paper entitled "Aseptic Packaging of particulate food products-A Review" authored by S.G.Patwardhan formerly of the CFTRI Regional Centre, Mumbai, published in the November-December-1999 issue of the "*Indian Food Packer*".

While adjudging the paper as the "Best Review Paper" the Panel has observed that the subject of the review is of topical interest to the scientists and Industry. Aseptic packaging of particulate food products like fruits and vegetables is gaining ground globally. The author has attempted an exhaustive review of the technology and various problems, constraints and possibilities. He has also provided guidelines for validation process for multiphase foods. The review covers 51 references from international journals, proceedings of symposia and books.



KEJRIWAL AWARD-1999

The Kejriwal Award instituted in 1977 by M/s Kejriwal Enterprises, New Delhi is being given annually for the "Best Article of Interest to the Industry" published in "*Indian Food Packer*" during the calendar year. The Award carries a sum of Rs.2000/- and a citation.

The Kejriwal Award for 1999 is given to the paper entitled "Prolonging storage life of Banana fruits by sub-atmospheric pressure" authored by F.Magdaline Eljeeva Emerald and V. V. Sreenarayanan of the Department of Agricultural Processing, College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore, published in the May-June 1999 issue of the "*Indian Food Packer*".

While adjudging the paper as "Best Article of Interest to the Industry" the Panel has observed that Banana is one of the important fruits widely grown in India and several other countries of the World. The fruit has poor shelf life under tropical conditions due to its specific physico-chemical characteristics. Refrigerated storage and transport are not of much help as the fruit is susceptible to chilling injuries. As the Banana produced in India is handled at ambient temperature, appropriate storage technology is essential. The authors have worked out a technique for storage of a particular variety of Banana under subatmospheric pressure at ambient conditions which can prolong the shelf life of the fruits upto 30 days as against the normal 5 days. The process holds good potential for adoption by the Banana growers and industry.



DR.J.S.PRUTHI AWARD-1999

Dr. J.S.Pruthi Award, instituted in 1997 by Dr. J.S.Pruthi, New Delhi is given annually for

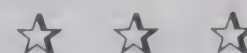
Development of New Products / New Process /New Machinery in Fruit & Vegetable Processing published in "Indian Food Packer" during the calendar year. The Award carries a sum of Rs. 2000/- and a citation.

The Dr. J. S. Pruthi Award for 1999 is given to the paper entitled "Innovations in raw mango processing machinery" authored by S. C. Mandhar and G. S. Kumaran of the Indian Institute of

Horticultural Research, Hessarghatta, Bangalore published in the November-December-1999 issue of the "Indian Food Packer".

While adjudging the paper as a development of New Machinery in Fruit & Vegetable Processing, the Panel has observed that India is the largest producer of mango in the World and the raw fruit is widely used for making pickles and chutneys. The process involving cutting into pieces, kernel removal and bottle

filling are all done manually, which is a labourious job leading to low productivity and also involving unhygienic conditions. The authors have developed new machinery for raw mango processing of varying capacity, namely, grader, peeler, slicer, cube cutter and grater, some of which are being patented. The new machinery will greatly help the processing industry.



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MINUTES OF THE 5TH EXECUTIVE COMMITTEE MEETING HELD IN THE CONFERENCE HALL OF CONSULTANCY DEVELOPMENT CENTER, NEW DELHI ON 19TH DECEMBER, 2000.

Sh. Gokul Patnaik, President presided over the meeting. The list of the members who attended is enclosed (Leave of absence was granted to those who could not attend.)

President welcomed the members and after brief remarks requested them to take up agenda issues:-

1. *Approval of the minutes of the Executive Committee Meeting held on 20th Oct, 2000 at Bangalore.*

Unanimously approved-proposed by Sh. N.M.Kejriwal and seconded by Sh. J.S.Srivastava.

2. *Report of the Chief Editor for Indian Food Packer Awards.*

Sh. K. L. Radhakrishnan informed the members that a committee consisting of Dr. A.K.Bhatia, Dr. J.S.Pruthi, Dr. M.M.Krishna and himself considered the papers published in *Indian Food Packer*, during 1999 and came to the conclusion that the following papers may be given the awards as adjudged the best papers;

(i) **K.U.Patel Memorial Award-1999**

Dr. A.R.Rege & Dr. J.S.Pai of the Deptt. of Chemical Technology,

University of Mumbai, Matunga, Mumbai for the overall best paper, "Thermal Processing of Sapota"

(ii) **N.N. Mohan Award-1999**

Dr. M.Singh, Dr. U.S.Shivhare, Dr.H.Singh and Dr. A.S.Bawa of Guru Nanak Dev University, Amritsar for the best research paper, "Osmotic Concentration Kinetics of Amla Preserve".

(iii) **Kejriwal Award-1999**

Ms. F. Magdaline Eljeeva Emerald and Dr. V.V.Sreenarayanan of Deptt. of Agril, Processing, College of Agril, Engg., Tamil Nadu Agricultural University, Coimbatore for the Best Article of interest to the Industry, "Prolonging storage Life of Banana Fruits by sub-atmospheric Pressure"

(iv) **N.A.Pandit Award-1999**

Mr. S.G.Patwardhan formerly of the CFTRI Regional Centre, Mumbai for the Best Review Paper "Aseptic Packaging of particulate food products".

(v) **Dr. J.S.Pruthi Award-1999**

Dr. S.C.Mandhar & Dr. G.S.Kumaran of the Indian Instt. of Hort.Research. Hessarghatta, Bangalore for their paper "Innovations in raw mango

processing Machinery"

3. *Announcement of Kashalkar Memorial Award, S.K.Mitra Memorial Award, S. Jatia Memorial Award, President's special award, Ganesh Food Product award and Y.K.Kapoor award for outstanding students.*

(i) **Kashalkar Memorial Award-1999**

Sh.P.M.Sinha of M/s Pepsi Foods Ltd. was selected for this award for developing high breed tomatoes for processing and for outstanding contribution to Agri-business and food processing activity of Pepsico, with a 10gm. Gold Medal and a Citation.

(ii)**Soilendra Krishna Mitra Memorial Award-1999**

Dr. V.Prakash, Director, CFTRI, Mysore was selected for his outstanding contribution in the field of Food Science & Technology, carrying a 10 gm Gold Medal and a Citation.

(iii) **Subhkaran Jatia Memorial Award-1999**

Sh. S.N.Prahlad, Chief Executive, SNP Associates, Bangalore was chosen for his life long contribution to food processing industry for this award, given for the first time from this year, carrying a Gold Medal of

10gm and Rs.5000/-in cash.

(iv) Ganesh Food Products Award-1999

Sh.D.S.Chadha, Food Laws Adviser, CII, Delhi was selected for this Award for his life long outstanding work on food laws, carrying a Silver plate and a citation.

(v) President's special award-1999

Dr. S.K.Saxena, Director,FRAC was selected for this award for his outstanding work on quality control standards benefitting the F&V.P industry. This award carries a citation and a silver plate.

(vi) Talib Chankrawali Award-1999

Two Scholarships of Rs.1000/- each to two students of Delhi Institute of Hotel Management & Catering Technology has been sponsored by Shri Y.K.Kapoor in his father's name. This year's scholarships go to Miss Pranamika and Miss Seema Bhatia on the recommendations of the Principal and Secretary of the Institute.

(vii) Dayanand Memorial Scholarship - 1999

Dayanand Memorial Scholarship-1999 was given to a student of Government Food Preservation and Canning Institute, Lucknow on the recommendation of the Executive Director. A sum of Rs.3600/- was

paid to Mr. Udai Raj a student of two year post graduate course in Fruit Technology.

4. Report of the Vice-President.

Dr.S.Jindal briefed the members about the action initiated during the last year. Report already circulated was discussed and adopted.

5. Nominations recieved from the members for various positions.

Sh. Y.K.Kapoor read out the names of the persons for various positions received from each zone. There was only one name each for the positions of President and Vice-President which were approved to be cleared by the Annual General Meeting.

President and Vice-President were authorised to form Zonal and other Committees.

6. Any other item with permission of the Chair:-

(a) List of new members enrolled was adopted.

(b) Audited Accounts 1999 - 2000 and Budget Proposals for 2000 - 2001 were adopted unanimously proposed by Sh. J. S. Srivastava and seconded by Sh. R. L. Chopra.

(c) Programme for National Seminar & Conference was adopted. Sh. Omesh Saigal, Secretary Deptt.of FPI to deliver the Key note address and Sh. TH. Choaba Singh, Hon'ble Minister for FPI to distribute prizes

and deliver inaugural address.

(d) The issue of setting up of Laboratories at Dharmapuri (Tamil Nadu) and in the existing Association's office at Calcutta and other places was discussed. It was decided that Dharmapuri Distt, Fruit & Vegetable Processors Federation's proposal may be considered and project for setting up the Food Testing Lab may be assisted. Besides, Laboratory in the existing premises of the Association at Calcutta may be worked out in collaboration with FRAC.

(e) The issue of local Sales Tax in Gujarat was discussed. It was decided that the matter may be taken up with Deptt. of Food Processing and the State Government.

(f) It was decided to pass a resolution in the A.G.M. regarding Food Laws in the light of M/s Malabar Coast letter dated 4th December, 2000 as proposed by Shri George Issac for 'Food Safety'.

(g) A report received from Pune Chapter was placed before the committee.

Meeting ended with thanks to the Chair.

Members were invited for the High Tea.

(K. P. Sarin)

Executive Secretary



NEW MEMBERSHIP OF ALL INDIAN FOOD PROCESSORS' ASSOCIATION

Sr.	Name of the Company	Caegory	Zone	Proposed by
1.	Sh. Sunil Sainju Roshi Products KHA-z-774, Kathmandu, Nepal	Ordinary Rs. 1250/-	East	Dr. Jindal
2.	Mr. Atul D Bamaomer Trimurti Foods 'Sarkar' Building Near J.K. Towers Adalat Road, Aurangabad - 431005 (M.S.)	Ordinary Rs. 1250/-	West	Dr. Jindal
3.	Kamdhenu Co-operative Dairy & Fruit Processing Socceity Ltd. Gollkatta, SIRSI. (N.K.) PO. Onikeri Sugavi Exc 84743	Ordinary Rs. 1250/-	West	Dr. Jindal
4.	Jayani Patel Director Ekta Fresh Foods Ltd. PO. Sokhda Disttt.Khambhat Pin : 388620	Ordinary Rs. 1250/-	West	Dr. Jindal
5.	Mr. R. H. Chordia Director Pravin Masalewale 44, Hadapsar Ind. Estate. Pune - 411 013	Ordinary Rs. 10,000/-	West	Dr. Jindal
6.	Mr. Rakesh Amin Patnaik Foods Opp. Telerpura Village Dharmaj Chokdi, Petlad Road Dharmaj - 388430	Ordinary Rs. 1250/-	West	Dr. Jindal
7.	Dr. H. O. Gupta Cummings Lab, Indian Agricultural Research Institute New Delhi - 110 012	Ordinary Rs. 750/-	North	Dr. Jindal
8.	Knight Queen Industries Pvt. Ltd. A-14, (1st Floor), Wazirpur Industrial Area, Delhi - 110 052	Ordinary Rs. 1,250/-	North	Dr. Jindal
9.	Sh. Vikram Goyal Amit Food Products S-61, Badli Indl. Estate Phase - I, Delhi	Ordinary Rs. 1250/-	North	Dr. Jindal

Sr.	Name of the Company	Caegory	Zone	Proposed by
10.	Sh. Y. Vidya Sagar Managing Director Southern Citrus Products (P) Ltd. Kamala Bhavan. 15/337-16 Varada Nagar, Gudur 524 101	Ordinary Rs. 1250/-	South	Dr. Jindal
11.	Mr. S. Madan Vice President ITC Agro-Tech Ltd., 31, Sarojini Devi Road Secunderabad - 500 003	Ordinary Rs. 10,000/-	South	Dr. Jindal
12.	Mr. S. K. Chakhaborty General Manager, R&D Britannia Industries Limited Research & Development Centre 194, M. T. H. Road, Padi Madras- 600 050	Corporate Membership Rs. 1,00,000/-	South	Dr. Jindal
13.	Mr. Philip C. H. Cullisor Managing Director Civil Cal Orchard Pvt. Ltd. Perumatal, Kanthalore P.O. 685 620 Idukki Dist. Kerala State.	Associate Member Rs. 750/-	South	Dr. Jindal
14.	Sh. Kanchanlal Desi M/s Murohi Food Products A1 & PO Magod (Mandir) Via : Atul 396020. Distt. : Valsad (Guj)	Individual Rs. 1,250/-	West	Vasundhara Canning Pvt. Ltd.
15.	Dr. Manish Srivastava "Health nd Madicar" A/T/4, Project Colony Mayapuri Haridwar - 249401 (U.P.)	Individual Rs. 750/-	North	Sh. P.P.S. Dhillon
16.	Sh. Navdeep Rajpal Mrs. Bector's Food Specialities (P) Ltd. B-XXXIII-324, G.T. Road (West) Jaladhar Byepass Ludhiana (Pb)	Ordinary Rs. 5,600/-	North	Mr. K. K. Malviya BEC Foods
17.	Mr. Satish Malhotra Managing Director M/s Pacific Foods Pvt. Ltd., E-108, Crystal Plaza New Link Road, Andheri (W) Mumbai - 400 053	Ordinary Rs. 1,250/-	West	Permonsons Food Pvt. Ltd.
18.	Sh. Vijay Shah Petals Professional Services 8/4, Kamal Park Soc. Nr. Arunachal, Subhanpura, Vadodara - 390 023	Individual Rs. 750/-	West	Sh. P.P.S Dhillon

Sr.	Name of the Company	Caegory	Zone	Proposed by
19.	Sh. Ajit Jain Chief Executive Dhariwal Industries Ltd., N.H. No. 8 at : Fazalpur P.O. Sakarda Dist. Baroda - 391 350	Ordinary Rs. 11,000/-	West	Dr. Jindal
20.	Mr. Siddharth Doshi Director Dhariwal & Doshi Ind. Ltd. 11-13, VP Industrial Ware Housing Soc. NH No: 8, Padmale, Dist, Baroda.	Ordinary Rs. 11,000/-	West	Dr. Jindal
21	Sh. Pariani Dayal Saeway Exports 10, Rex Chambers G R Floor, W. H. Marg Near G.P.O Mumbai	Ordinary Rs. 1250/-	West	Dr. Jindal
22.	Sh. Rakesh Surana Managing Director M/s K.K.Beverages Pvt. Ltd. M. S. Road Faney Bazar, Guwahati - 781 001 (Assam)	Associate Rs. 3400/-	East	Dr. Jindal
23.	Sh. P.P.S Dhillon Chairman Alpha Lasartek (India) Ltd., F-90/1, Okhla Industrial Area, Phase - I New Delhi	Induividual Rs. 750/-	North	Dr. Jindal

LIST OF HOLIDAYS OF AIFPA DURING 2001

<u>DATE</u>	<u>MONTH</u>	<u>DAY</u>	<u>FESTIVAL</u>
26	JANUARY	FRIDAY	REPUBLIC DAY
21	FEBRUARY	WEDNESDAY	MAHA SHIVRATRI
9	MARCH	FRIDAY	HOLI
2	APRIL	MONDAY	RAMNAVAMI
15	AUGUST	WEDNESDAY	INDEPENDENCE DAY
2	OCTOBER	TUESDAY	GANDHI JAYANTI
26	OCTOBER	FRIDAY	DUSSEHRA
14	NOVEMBER	WEDNESDAY	DIWALI
16	NOVEMBER	FRIDAY	BHAIYA DUJ
25	DECEMBER	TUESDAY	CHRISTMAS DAY

MINUTES OF THE 56TH ANNUAL GENERAL MEETING HELD ON 21ST DECEMBER, 2000
AT 3.00PM. AT WORLD WIDE FUND FOR NATURE-INDIA, LODHI ESTATE, NEW DELHI

President Shri Gokul Patnaik presided over the meeting.

Leave of absence was granted to all those who could not attend.

President welcomed the members and after a brief review of the morning session and present prevailing industry scenario, the members were requested to deliberate on the issues listed in the agenda.

The agenda items were taken up as follows :-

1. *Adoption of the minutes of the Annual General meeting held in New Delhi on 10th December, 1999.*

Minutes were adopted unanimously-proposed by Shri S.N. Mitra and seconded by Shri R.L. Chopra.

2. *Presentation of the current year's report of the activities by the Vice-president:* Dr. S. Jindal informed that the Vice-President's Report has been circulated and he will like to clarify any issues raised by the members. The report was adopted. (enclosed).

3. *To adopt accounts of the Association for the period ending 31 st March, 2000 and the budget proposals for 2000-2001.*

Audited accounts and budget proposals were adopted as proposed by Shri J.S. Srivastava &

seconded by Sh. N.M. Kejriwal.

4. *To appoint auditors for the year 2000-2001.*

M/s Prasad Rajindra & Co. Chartered Accountants, New Delhi were appointed for the year 2000-2001 on an annual fee of Rs. 5000/- only.

5. *To consider and adopt the resolution and proposals received from the members.*

The resolution adopted by the Annual General Meeting about "Safe food" is enclosed as Annexure 1.

6. *To select office bearers and members of the Executive Committee.*

The following names were received for various positions.

President-Sh.Gokul Patnaik
Vice-President-Dr. S.Jindal
Nominations received for Executive committee :

East zone :

Shri Vinod N. Thacker

West Zone :

Shri Ashok Bhiwapurkar,

Shri A.K.Tejani,

Shri Vijay Shah,

South Zone :

Shri Sitaram Goenka

North Zone :

Shri D.S Chadda,

Shri P.L Kaul.

Shri R. K. Sanghi,

Shri H.O.Gupta.

Shri P.SDharamwal,
Shri Rakesh Jindal
Shri K.K.Malviya,
Shri S.Kurade

It was unanimously adopted that the new President & Vice President may be authorised to form the Executive committee and the Organisation chart for 2000-2001 may be circulated to the members.

7. *Any other item with the permission of the Chair.*

(a) Mr. P.P.S.Dhillon. past president was thanked for having donated two Computers from Nestle to the Association's secretariat. The Association has taken the Internet Connection from VSNL. It will facilitate to access foreign markets and gather technical information.

(b) Sh. N. M. Kejriwal complimented that the expenditure of the Association has been restricted at the level of last year. However, there is a need to collect atleast Rs. 1 crore as corpus fund so that effective service may be provided to the members.

(c) Present Status of Indian Food packer was discussed. Dr. K.L.Radhakrishnan, Chief Editor, *Indian Food Packer* was requested to mobilise collection of Advertisement to the journal (IFP) and improve the health of *Indian Food Packer*.

Chief Editor requested the members to collect advertisements to make the bi-monthly journal self supporting. Various suggestions were put forth by the members. It was proposed that in the Editorial Board effective persons from trade and industry may be inducted to support AIFPA cause.

(d) Mr. P. P. S. Dhillon was requested to send comments on Food Processing Regulatory Bill 2000 within the next few days as desired by the Secretary, Food Processing Industries.

The meeting ended with thanks to the chair and all members were invited for high-tea.

K. P. Sarin
Executive Secretary

Resolution concerning Safe Food

This Annual General Body Meeting of the All India Food Processors' Association held on 21.12.2000 request the Ministry of Health, Government of India to implement the Prevention of Food Adulteration Act 1954 so as :-

1. To ensure the safety of food in this country, and specifically to focus the Act on restricting the sale of foods that are injurious to health, viz, foods containing pesticide residues, farm chemicals, other poisonous substances, bacteria, extraneous matter, filth etc. in excess of safety levels.

2. To restrict the notification of standards under the Act to such standards the contravention of which are injurious to health and to focus on implementing such standards.

3. To provide trade and industry the facilities they require for voluntary compliance, specifically information concerning the methods of analysis to be used, and access to accredited laboratories in which samples can be tested for compliance with notified standards.

4. To provide trade and industry fiscal and other incentives to implement systems to ensure that the food they sell is safe and that it is processed and sold in hygienic and sanitary conditions.

5. To ensure that the vendor concerned is given one of the samples drawn by the Food Inspector which he can have independently analyzed for his defence, by any accredited laboratory.

6. To delete the existing provision in the Act which makes the second analysis findings of a Central Laboratory final and conclusive as evidence in courts.

7. To ensure utmost accuracy and reliability in the analysis of samples by public analysts .

8. To ensure that there is application of mind by a competent and knowledgeable authority before

consent is given to prosecutions under the Act, so that the prosecutions are in the public interest and such that they promote the cause of ensuring safe food hearing before legal action is taken.

9. That state Public Analysts are precluded from finding whether the samples they analyze are adulterated or not. Simple, clear and understandable definition of word, 'Adulteration' is required.

10. To ensure that state governments do not confer the authority of 'consent' contemplated in section 20 of the Act on Food Inspectors,

11. That the authority to decide penalties by taking into account the intentions of the accused and the injury to the public, be restored to the courts.

12. A memorandum of understanding should be drawn up under the law between the GMP certifying agency & PFA authorities if any violation is found in the analysis. Similar provision exists in FDA rules.

13. The system of designing and laying down standards need to be restricted to committees like CCFS, Sub- committees looking into present environment & speed.

Proposed by : Sh. George Issac
Seconded by : Sh. P. P. S. Dhillon



Report of the Vice President, Dr. S. Jindal at the 56th AGM on 21.12.2000

Dear Fellow Members,

1. I have the pleasure to present the Annual Report of All India Food Processors' Association for the period 1999-2000.

2. The activities of the Association were carried out through the Executive Committee and various committees formed during the current session.

3. The Executive Committee had five meetings during the period as per details given below :

1. 08.02.2000 Delhi
2. 06.03.2000 Delhi
3. 30.06.2000 Mumbai
4. 20.10.2000 Bangalore
5. 19.12.2000 Delhi

EXECUTIVE COMMITTEE MEETINGS:

1st Executive Committee Meeting on 8th Feb., 2000-New Delhi

The following business was transacted:

- (a) Organisation Chart was finalised and approved.
- (b) Report on TQM Workshops in collaboration with the Ministry of F.P.I at Chittoor on 28th Jan 2000, Krishnagiri and Nagpur on 19th Feb., 2000 was given.
- (c) Setting of the Food Testing Laboratory by the Association.

A Committee was appointed to take decisions under the Chairmanship of Shri N. M. Kejriwal.

- (d) Stress was made to convene Zonal / Chapter meetings quarterly.
- (e) Codex Committee was formed to identify the issues of Industry's importance.
- (f) Strategy for Union Budget.
- (g) Reaction to Uniform Sales Tax Proposals.
- (h) Approach to Duty Drawback issues.

IIInd Executive Committee Meeting on 6th March, 2000, New Delhi

The highlights of the issues were as under:

- (a) Local industry needs to be promoted with protective tariffs.
- (b) Local Food Laws (PFA, Packaged Commodities Order etc.) should give a fair field to Indian Industries.
- (c) Imported goods should conform to Indian food laws. The temporary stickers should not be allowed on foreign foodstuffs and only proper tables should be permitted.
- (d) Importers should be registered.
- (e) Ingredients should be declared

on imported packed foods.

IIIrd Executive Committee Meeting on 30th June 2000 - Mumbai.

- (a) President thanked MAIDC for successfully organising T.Q.M. Workshop for the industry in Maharashtra at Mumbai.
- (b) Proposal to set up Food Testing Laboratories was finalised in order of priority at Mumbai, Nagpur, Baroda and Pune within a time bound period. The conveners were to finalise proposals.
- (c) Setting up of a website of AIFPA. Denco was to provide a portal site free to the Association to feed data and information on technology.
- (d) Corporate membership to selected industries in West Zone was identified as a programme for senior members so that a corpus fund may be created to expand the activities of the Association.
- (e) Comments on W.T.O, Codex and National Policy on food processing industries were assured to be sent from this Zone members.

IV th Executive Committee Meeting on 20th Oct., 2000 Bangalore

In this meeting, President gave opportunity to regional industry members to highlight regional issues.

- i. Sh. P.T.Raju informed about the T.Q.M programmes successfully completed at Chittoor and Krishnagiri.
- ii. Mr. Venkatswamy from Krishnagiri wanted that laboratory for testing the products may be set up at Krishnagiri. There was a need to stabilize prices of mango as raw material since every year there are wide fluctuations.
- iii. Sh.Bijay Kumar, IAS, Chairman, West Zone highlighted the activities and issues :-
 - (a) Four Seminars were conducted in different places in Maharashtra highlighting the problems and solutions for the growth of Food Processing Industries.
 - (b) Impact of W.T.O and its implementation.
 - (c) Import and marketing of orange juices from Brazil.
 - (d) Role of market committees in handling issues like price and supply of raw-materials.
 - (e) Setting-up of Training Center at Maharashtra Agro.
 - (f) Need for strict compliance of P.F.A.regulations for imported products. Sh.Bijay Kumar complimented the Association to setup a portal

site for the Processed Food Industry.

- iv. Sh. George Issac, Chapter Chairman, Kerala stated that the PFA is arbitrary with irrational laws, rules and regulations. They do not help the industries' cause for the honest processors and canners. He raised the issue of definition of word "Adulteration". Shri Issac brought out the history of the last few years efforts that AIFPA have been trying hard to get the P.F.A. amended and follow the guidelines with the Codex Standard. He wanted authority to make provisions and not to leave the interpretation at Food Inspector Level. He cited about the penalty clause and desired that such a decision should be left with the Courts. He also suggested that the Govt. should make industry and consumer friendly food laws.
- v. Sh. Ravinder Nath, Convenor Chittoor Chapter raised the following issues:-
 - (a) Pollution Control on liquid waste and disposal of solid waste.
 - (b) Small units of Chittoor must be assisted by the export houses for upgradation of factory operation and around processing Units.
 - (c) Setting up of the testing laboratory at Chittoor. He desired that this initiative

should be taken up by AIFPA.

- vi. Sh. R.Nagaraj Rao, Jagadale Food Industry, Bangalore desired that the import of foodstuffs into India must conform to PFA-FPO standards. The ingredients which are not allowed, should not be permitted in imported Food Stuffs. He desired that a R &D Center for Mango Products must be set up so that more new products and improved varieties may be used by processors. He wanted other fruits and vegetables be explored to increase the period of processing. He desired that there is a need for mutual discussion to take up the relevant issues with Department of Food Processing Industries. Pollution Control measures are the need of the country and industry friendly pollution control measures must be developed in some type of package form.
- vii. Sh. O.P.Gera suggested that machinery is available for utilisation of solid waste. Industry instead of depending on import solutions must utilise local technology.

viii Collection of Outstanding :

President reviewed the outstanding dues from South Zone members on account of Membership fees. This was a matter of serious concern and requested Mr. P. T. Raju to pursue this matter with the members to send their outstanding dues by the end of November 2000.

4. COMMITTEES / SUB-COMMITTEES

The Committees / sub-committees set up had a number of meetings and the major issues discussed are given below: -

Sl. No.	Committee/ Sub-Committee	Convener/ Chairman	No. of Meetings
1.	Technical Advisory Committee & Expert Panel	Dr. V. Prakash	2
2.	Taxation Committee	Dr. S. Jindal	5
3.	Packaging Committee	Sh. N. C. Saha	1
4.	Credential Committee	Dr. S. Jindal	5
5.	Editorial Board of IFP	Dr. K.L. Radhakrishnan	2
6.	Working Committee	Sh. N. M. Kejriwal	3

Technical Advisory Committee & Panel of Experts

A panel of experts was constituted this year to examine technical issues and advise the industry and Government on various issues connected with Food Laws, labeling matters and F. P. O. The panel was involved in advising on the matter of "National Policy on Food processing" and Technical Issues of Food Laws.

Taxation Committee

Memorandum on Pre-Budget for 2000-2001 proposal has been submitted to the Ministry of Food Processing Industries with a request to forward our recommendations to Ministry of Finance to remove excise duties on processed fruits & vegetables.

AIFPA made a presentation in the Dept. of F.P.I and Ministry of Finance.

Packaging Committee

During discussions on various aspects of packaging materials and packaging systems, the following issues were highlighted by the members.

i. Production of indigenous tinplate for OTS Cans.

ii. Quality packaging materials must be made available on World standards.

iii. Cost calculation of the total production including cost of

packaging materials and packaging operation must be comparable to that of China.

iv. Upgradation of technology to the small-scale manufacturers of packaging materials and their specification should be examined.

v. The suppliers and buyers must work jointly to improve the ultimate consumer pack.

Credential Committee

President was authorized to approve the membership applications and put up to Executive Committee for information. Applications of new members were considered and approved.

Editorial Board of IFP

i. It has been recommended to have a panel of specialists for specific inputs to IFP.

ii. Indian Food Packer was running

in loss due to constraints of advertisement on a regular basis. Members were appealed to mobilise more and more advertisements from the industry.

iii. Efforts are being made for strengthening the commercial inputs in IFP.

5. ZONAL COMMITTEES

(A) West Zone

Sh. Bijoy Kumar M.D, MAIDC and Zonal Chairman, West Zone apprised the members of the following issues :

i. Members may please bring in issues / copies of Resolutions to be discussed and placed before Central Body for Annual conference.

ii. Discussions on FPO notifications and the application of PFA on the Small & Medium Scale Industries.

iii. Scope for setting up of medium /Large scale Cashew nut processing plants in Konkan.

iv. Scope for setting up of Food Testing Lab. in Maharashtra i.e., Mumbai and Nagpur.

v. Suggestion on creation of Food Park at Butibori in Nagpur District and its contribution in attracting small and medium scale investment in Food Processing Sector.

vi. Review of issues /activities handled by Nagpur & Pune Chapters.

vii. Discussion on application of Indian Law on imported processed foods.

viii. T.Q.M Training Workshop was held at Mumbai, Rajkot, Jamnagar, Nashik and Baroda.

(B) North Zone

Chairman apprised the members of the following issues:

- T.Q.M. Training Workshops to be organised in various places in collaboration with Department of Food Processing Industries.
- North Zone outstanding list was very large. Sh.J.S.Srivastava requested members to clear the dues.
- Generic publicity for processed foods.
- Difficulties faced by the industry owing to the recent orders of Supreme Court regarding pollution control.

(C) South Zone

- Activating South Zone to cover states of Tamil Nadu, Andhra Pradesh, Karnataka, Kerala and Pondichery.
- To consider the outstanding dues of the Members of the South Zone.
- Zone attempted to regulate the mango prices. It was proposed to set up Mango Crop fund.
- T.Q.M Seminar was held at Krishnagiri and Chittor.

"INDIAN FOOD PACKER"

(1) A total number of 43 Research and Review Papers were published in the 6 issues. Besides, a number of articles of general interest were also published.

The subscription received for Indian Food Packer and advertisement collection for Indian Food Packer during the last three years is as under:

Year	(in Rupees)
1998-1999	2,11,687
1999-2000	2,28,658
2001-2001	1,74,364

(2) A Committee with Shri K. L. Radhakrishnan, Chief Editor as Chairman and Dr. J. S. Pruthi, Dr. A. K. Bhatia, Dr. M. M. Krishna as Members has been constituted to make recommendations for Indian Food Packer awards for 1999 which recommend the names of awardees for 1999.

DAYANAND MEMORIAL AWARD

Dayanand Memorial Award was instituted in 1984 with an amount of Rs. 40,000/- kept in fixed deposit. Two scholarships of the value of Rs.150/- per month each are given to deserving students of Government Fruit Preservation and Canning Institute, Lucknow. During 1998 & 1999 the Institute recommended the name of Sh. Udai Raj, Post Graduate student in Fruit Technology, Lucknow to whom the award money has been remitted.

MEMBERSHIP

The membership of the Association at the time of last Annual conference held on 10th December 1999 stood at 405. The Association had no option except to struke off the constant defaulting ones. The present position as on 31st October 1999 is as under:

Corporate Members	6
Ordinary	310
Honorary	8
Individual	45
Associate	44
Total	413

We note that serious situation is arising by non-receipt of dues timely from members. The position of outstandings upto November 2000 for the last 3 years is as under:

Zone	Amount 1998	Amount 1999-2000	Amount 2000-2001
North	64,000	1,48,000	3,97,265
South	52400	75,900	1,71,200
East	41,400	58,600	26,610
West	1,09,100	1,88,800	90,800
Total	2,66,900	4,71,800	6,85,875

Your Association participated in many important events/ seminars etc. organized by APEDA, CII, PHD Chamber of Commerce and Industry, FICCI, CIFTI, Assocham, FIEO, France Embassy, U.K.High Commission and others.

The annual membership fee of the Association continues to be based on annual turnover. The details of the membership fee are given hereunder :

	Annual fees Admission fee	
Annual individual members	Rs.500/-	Rs.250/-
Annual turnover upto Rs.20 Lacs	Rs.1,000 /-	Rs.250/-
Annual turnover upto Rs.50 Lacs	Rs.1,600/-	Rs.250/-
Annual turnover upto Rs.1Crore	Rs.2,400/-	Rs.1000/-
Annual turnover upto Rs.2.5Crore	Rs.4,000/-	Rs.1000/-
Annual turnover upto Rs.5 Crore	Rs.5,600/-	Rs.1000/-
Annual turnover upto Rs.10 Crore	Rs.10,000/-	Rs.1000/-

Representations

In order to concretise the role of A.I.F.P.A., the Dept. Of Food Processing Industry was requested to take steps on the following issues in direct participation by the Association and other Associations as Associates to the role played by AIFPA :

1. Department of Food processing Industries was requested that a Data base of the F&V products must be created in the Department which should include;

- (a) Production of F&V products
- (b) Imported Food Stuffs, (item, quantity, value, sources etc.)
- (c) Directory of Food Machinery Manufacturers

2. Issues relating to the following were taken up with concerned authorities.

- a. Most imported food products are not as per Indian Laws, PFA, FPO, Packaging Commodities Order etc.

- b. Natural Food Colours for Food Products to be developed.
- c. Labelling provisions under PFA rules and Standards of wt. & Package Commodities Order.
- d. Irradiation provisions under PFA rules 1955.
- e. Use of artificial Sweeteners in Beverages.

Press Coverage/Publicity

The Food Processing Industry, a thrust area for export is attracting large foreign investments. The foreign media has played a key role to motivate foreign investors to make investment in this sunrise sector. Similarly, Indian press prominently covered the status and opportunities in Food Processing Industry. All India Radio and T.V.programmes have continued to highlight this area of national activity.

Apart from the nodal Ministry, Deptt, of Food Processing Industries, AIFPA continued to get full support of different Ministries/ Departments, Ministry of

Commerce, APEDA, Ministry of Agriculture, I.C.A.R., National Horticulture Board, Ministry of Health and Family Welfare, Planning Commission, Ministry of Civil Supplies and Public Distribution, CFTRI, CSIR, Modern Food Industries (India) Ltd. etc.

Department of Food Processing Industries have been assisting in the activities of the Association for the development of Food Processing Sector. The Association always had an easy access to the Ministry's Officers and got all support from the Secretary, Joint Secretary, Director (F &VP) and all other connected officials.

We had a very close interaction with National Chambers of Commerce and Industry in India and served on their Committees. FICCI (CIFTI), CII, Assocham, PHD Chamber of Commerce & Industry are associated with us on all issues relating to Food Processing Sector.

Our special thanks are due to Sh. P. S. Bhatnagar, Secretary, Dept. of FPI, Sh. K. K. Gupta, Joint Secretary, Dr. Dalip Singh, Sh. R. K. Bansal, Sh. Kumar Bhatia and other officers and staff.

Sh. Omesh Saigal has taken over as Secy, Deptt. Of Food Processing Industries and we welcome him. Our profound thanks also due to Sh. TH. Chaoba Singh who as Minister of State of F.P.I. has been taking up issues on food processing. We are thankful to Sh Deepak Gupta, JS, Ministry of Health

for responding to industries issues. Our thanks also go to the Dept. of FPI for funding the TQM workshops at 10 places in the country.

We welcome Smt. Vibha Puri Das who has taken over as Joint Secretary, Deptt. Of FPI, Sh.A.K.Goel and Sh.K.K. Vyawahare, Directors who have taken up the industry issues with different bodies. We look forward to a close cooperation with them for solving the problems of Food Processing Industries in India. Shri D. Rajagopalan. Chairman of APEDA, has supported the industry's cause and we value that and place on record our gratitude. I am also grateful to all the members and colleagues for their valuable

contributions in furthering the activities of the Association.

Profound thanks are due to the President, Members of the Executive Committee, Chairmen and Members of various Subcommittees who spared their precious time to devote to the programmes of the Association.

I also thank the staff of the Association, particularly, Shri K.P.Sarin, Executive Secretary, but for whose hard work and imagination it would not have been possible to work efficiently and pursue various matters at all levels. I am also thankful to Sh. K.L.Radhakrishnan, Chief Editor of IFP for his contribution to continue improving the I.F.P.

We greatly appreciate the goodwill of Nestle India Ltd. and particularly Mr. P.P.S.Dhillon for having donated two computers for office of the A.I.F.P.A

The State Governments have been very co-operative in organizing the meetings of the industry at several places and on behalf of the Association we place on record our deep gratitude to all of them.

I am confident that the new office bearers will purse the cause of the Association with great vigour and zeal and evolve strategies to make India's position unique in Processed Food Sector.

Thank you,

Jai Hind

LIST OF PARTICIPANTS AT THE ANNUAL CONFERENCE

1.	Dr. J. C. Anand	B/74, Kalkaji,	New Delhi
2.	Shri S. C. Mandhar	IIHR,	Bangalore
3.	Dr. V. V. Karnik	Sygnnet Consultants,	Pune
4.	Shri R. Gopinath	CDC	New Delhi
5.	Shri B. S. Bhatia	CSIR	New Delhi
6.	Shri Abhiram Seth	Pepsi Food Ltd.	Gurgaon
7.	Shri H. C. Lal	Sarvdeep India Ltd.	New Delhi
8.	Shri G. Kalra	Coca-Cola India,	New Delhi
9.	Dr. H. S. Shivhare	D.E.S.T	Amritsar
10.	Dr. S. Jain	Jain Consultants	New Delhi
11.	Dr. D. S. Khurdia	IARI,	New Delhi
12.	Dr V. R. Sagar	IARI,	New Delhi
13.	Dr. Vijay Sethi	IARI,	New Delhi
14.	Dr. S. B. Maini	IARI,	New Delhi
15.	Shri Venkat Prahlad	SNP Associates,	Bangalore
16.	Ms. Ila Gupta	PHD,	New Delhi
17.	Shri R. N. Gupta	Candian High Commision	New Delhi
18.	Shri Shashi Arora	Sunrise Foods,	New Delhi
19.	Shri George Isaac	Malabar Coast Products	Kottayam
20.	Shri S. V. Padmanabhan	Pepsi Foods Ltd.	Gurgaon
21.	Shri B. L. Kapoor	I.F.C	New Delhi
22.	Shri Bijay Kumar	MAIDC Ltd.,	Mumbai
23.	Shri S. S. Prasad	MAIDC Ltd.,	Mumbai
24.	Shri P. N. Narang	Gurdner	New Delhi
25.	Shri Vijay Shah	Petals Professional Services	Baroda
26.	Shri A. K. Kanchan	M.F.I.L.	New Delhi
27.	Shri. S. K. Nigam	M.F.I.L.	New Delhi
28.	Col. Y. P. Chopra	Ministry of Agriculture	New Delhi
29.	Shri V. K. Sharma	TAFCON India Ltd.	New Delhi
30.	Shri H. S. Sharma	I.A.R.I.,	New Delhi
31.	Shri P. Saxena	NCDC	New Delhi
32.	Shri Zakariah Ahmed	C.I.I.	New Delhi
33.	Shri V. Paviov	Embassy of Russia	New Delhi
34.	Shri Valery Khromchenkov	Embassy of Russia	New Delhi
35.	Shri. S. Singh	Meeta Dey Froze	
36.	Dr. S. K. Saxena	FRAC	New Delhi
37.	Shri S. V. Subharao	CDC	New Delhi
38.	Shri R. S. Sisodia	Ministry of Agriculture,	New Delhi
39.	Shri P. R. Agrohan	I.A.R.I	New Delhi
40.	Shri K. Premakumar	I.A.R.I	New Delhi

41.	Shri Raman Jindal	Raksha Agro Pvt Ltd	Kalka
42.	Prof. S. K. Roy	I.A.R.I	New Delhi
43.	Shri M. L. Uppai	Clearline Foods Ltd	Chandigarh
44.	Shri P. K. Sudhir.	Dept. of FPI	New Delhi
45.	Suredar Kumar Budhraj	M/s Crushers Fruits Juice Co.	Calcutta
46.	Shri C. B. Kothari	Dept. of F.P.I.	New Delhi
47.	Shri P. L. Kaul	Mariental India Pvt. Ltd.	New Delhi
48.	Shri P. C. Anand	Nestle India Ltd.	New Delhi
49.	Shri S. N. Mitra	MIDA & Co Pvt Ltd.	Calcutta
50.	Smt. Arati Mitra	MIDA & Co Pvt. Ltd.	Calcutta
51.	Dr. J. S. Pruthi	Food Scientist (CFTRI)	New Delhi
52.	Dr. V. Prakash	CFTRI	Mysore.
53.	Shri R. K. Tyagi	Three's Foods	Shahibad
54.	Shri S. Dixit	Intl. Tread Law Counsultant	New Delhi
55.	Shri N. M. Kejriwal	Kejriwal Group	New Delhi
56.	Shri M. Bhatia	Div.F.V.P.(Retd)	New Delhi
57.	Dr. R. K. Pal	IARI	New Delhi
58.	Dr. O. P. Singhal	IARI	New Delhi
59.	Shri. R. S. Kalra	Mahan Dairy L.td	New Delhi
60.	Shri Dillip Chadha	CII	New Delhi
61.	Shri D.S.Chdha	CII	New Delhi
62.	Dr. R.S. Yadav	Krishak Bharti Co-operative Ltd.	New Delhi
63.	Dr. S. Lakshmi	Rajguru College of Applied Science	New Delhi
64.	Dr. S. Jindal	Excelsior Food &Chem.Industries	Delhi
65.	Shri R.L.Chopra	Kejriwal Enterprises	New Delhi
66.	Shri Kisan Mehta	Kalka Ji	New Delhi
67.	Shri Sudhanshu	APEDA,	New Delhi
68.	Shri P.P.S Dhillon	A.I.F.P.A.	New Delhi
69.	Shri G.Petros	Food & Agriculture Organization of the Inited Nations	New Delhi
70.	Dr. A. G. Naik Kurade	M/s Suman Food Consultants	New Delhi
71.	Shri. Shekhar Borker	Indian Aluminium Company, Ltd.	New Delhi
72.	Dr. H.O.Gupta	IARI	New Delhi
73.	Mr. Zhao Zhanfang	China Embassy	Lucknow
74.	Shri S.D. Shukla	12/673 Indra Nagar	New Delhi
75.	Shri R. K. Bansal	Deptt.of FPI	
76.	Shri K. K. Sareen		New Delhi
77.	Shri. N. Rasul	Deptt. of FPI	New Delhi
78.	Shri I. C. Sharma	ITV Agro Technologies P. Ltd.,	Gurgaon
79.	Shri L. J. Singh	M-12/1A, DLF-II,	New Delhi
80.	Dr. A. K. Bhatia	CSIR	

81.	Shri Y. K. Kapoor	Nirmal Services,	New Delhi
82.	Dr. Sushil Chandra Gupta	B-38, Soami Nagar,	New Delhi
83.	Shri S. R. Singh	Shibvambu International	Delhi
84.	Shri. T. S. Srinivasan	Embassy of Belgium	New Delhi
85.	Shri Satish Checker	Shriram Instt. for Indus Res.	New Delhi
86.	Shri K. K. Malviya	BEC Foods	New Delhi
87.	Shri Harbans Lal	PBL	New Delhi
88.	Shri J. Aggrawal	NPC	New Delhi
89.	Shri S. K. Premi	Allahabad Canning Co.,	Allahabad
90.	Shri Harsh Arora	Harnarain Gokulchand	New Delhi
91.	Dr. S. S. Arya	DFRL	Mysore
92.	Shri S. K. Virmani	Bhutan Fruit Products Ltd.	Bhutan
93.	Shri Rajesh Bajaj	NPC	New Delhi
94.	Ms. Gowri Sundaram	APEDA	New Delhi
95.	Shri D. V. Malhan	MFIL	New Delhi
96.	Shri R. L. Sachdev	DFPI,	New Delhi
97.	Shri N. S. Katoch	Cadbury India,	New Delhi
98.	Shri Lalta Singh	FPO	New Delhi
99.	Shri K. D. Singh	FPI	New Delhi
100.	Shri S. K. Sharma	FPI	New Delhi
101.	Dr. S. K. Saxena	FRAC	New Delhi
102.	Shri P. K. Sudhir	MFPI	New Delhi
103.	Shri Deepak Sharma	FPI	New Delhi
104.	Dr. Surjeet Singh	Deptt. of Hort. Food Processing,	U.P.
105.	Shri Vijay Bahadur Yadav	Deptt. of Hort. Food Processing,	U.P.
106.	Shri Raman Kunia	2369/1, W. Patel Nagar,	New Delhi
107.	Shri. Bhupendra Shrivastava	Besco Ltd.	New Delhi
108.	Shri R. K. Shukla	Gulmohar Enclave	New Delhi
109.	Shri Indrish Arora	BEC Foods	New Delhi
110.	Dr. H. H. Prasad	IARI	New Delhi
111.	Shri Bharatendu Kabi	Pepsi Foods Limited,	Gurgaon
112.	Shri J. S. Rawa	Dept. FPI	New Delhi
113.	Shri . R. C. Sahni	STC of India	New Delhi
114.	Shri P. K. Jha	Small Farmers' Agri-Business Consortium	
115.	Shri P. S. Dharamwal	Kwality KIC Food Products Ltd.	
116.	Shri S. K. Singh	Bokaro Foods Pvt. Ltd.	
117.	Shri Pranamiha	IHM, Pusa National Council	
118.	Shri Sinanda	Business Standard	
119.	Shri R. P. Singh	Deptt. of Horticulture and Food Processing	U.P.
120.	Shri J. S. Srivastava	MFIL	New Delhi
121.	Shri Satinder Narang	Gardners Corporation	
122.	Shri O. P. Dhingra	M/s Murli Dhar Ramkishan	

123	Shri R. Saigal	Usha Intercontinantal	New Delhi
124.	Shri B.V.R. Murthy	Usha Inter Continental	
125.	Shri Sudhir Mishra	APEDA or Skyweb India Ltd.	
126.	Shri M. R. Sundareshwaran	SIO, FPO, Govt. of India	New Delhi
127.	Shri V. Thirukumaran	FPI	
128.	Ms. Seema Bhatia	IHM	New Delhi
129	Shri M.P.S Puri	Synergy International	
130.	Shri Anand Krishnan	Royal Netherlands Embassy	
131.	Shri S. P. Mehta	Hindustan Tin Works Ltd.	Shaibabad
132	Shri Ramesh Chauhan	Parle Agro Ltd.,	New Delhi
133.	Shri Vijay Sardana	Achievers Resources	New Delhi
134.	Shri P. Karthy	MFPI	New Delhi
135.	Shri Ajit Kumar	MFPI	New Delhi
136.	Ms. Hema Sahu	Hindustan Tins Works	Sahibabad
137.	Shri S. K. Verma	Nirulas India P. Ltd.	New Delhi
138.	Shri A. B. Lal	PAO (FPI)	New Delhi
139.	Shri D. B. Sabharwal	APEDA	New Delhi
140.	Shri Seivjo M. R.	National Herald	New Delhi
141.	Shri Shishir Chandara	Rajasthan Patrika	New Delhi
142.	Shri N. K. Anand	Usha Intercontinental,	New Delhi
143	Shri Sandeep Chandara	Continental Crowns & Closures	New Delhi
144	Dr. K. L. Gaba	Britannia India Ltd.	New Delhi
145.	Shri. S. Mukherjee	CIFTI	New Delhi
146.	Shri S. Ahuja	CIFTI	New Delhi
147.	Shri S. Shreni	CIFTI	New Delhi
148.	Shri Vinay Aggarwal	Kaytis Food Preserves	New Delhi
149.	Shri Dayal Vyapak	Janakpuri,	New Delhi
150	Shri R. P. Shukla	Prasad Rajendra & Co.	New Delhi
151.	Shri. R. K. Jain	India International Mkt. Centre,	New Delhi
152.	Shri Ashok B. Sharma	Financial Express	New Delhi
153.	Shri Sunil Kumar	APEDA	New Delhi
154.	Shri S. P. Mittal	ARSP	New Delhi
155.	Shri. Nadeem Aksar	Processed Food Industry	New Delhi
156.	Shri S. S. Sandhu	B-104, Arun Nagar	New Delhi
157.	Shri R. Siran	Krishna Nagar,	Delhi
158.	Mrs. Krishna Nair	WWF	New Delhi
159.	Shri Sukhbir Saran	Faridabad,	Haryana
160.	Shri Ram Gopal Sharma	Safdarjung Enclave	New Delhi
161	Shri Gagan Beyond	Amalgam Enterprises	New Delhi
162	Shri Nitin	HTW	New Delhi
163	Shri V. K. Soni	NPC	New Delhi
164	Shri Rajesh Sund	NPC	New Delhi
165	Ms. Parminder Bajaj	BIS	New Delhi

TQM/HACCP WORKSHOPS ORGANISED BY AIFPA

TQM Workshop held on 12th Oct, 2000 at Jamnagar

A workshop on "Total Quality Management" was arranged by the Vadodara Chapter of the Association at Jamnagar, in association with the Dept. of Food Processing Industries, New Delhi on 12th Oct, 2000. This workshop is the third workshop of its kind in Gujarat, being arranged by the Association. The first one was arranged at Vadodara in March, 2000 and the second was at Rajkot.

In his introductory remarks, Chairman Mr. Vijay Shah, explained the need for organizing such workshops and also explained in detail the activity of the Association and the assistance being provided by the different Govt. Agencies in getting the Quality Certification. He also explained in detail why such kind of awareness is needed in the present market and urged the participants to implement the Quality Management at all levels in overall interest.

Mr. Chandresh Shah, CEO Madhav foods, Dabhase was the main speaker, apart from Dr. Sakrikar from QAS, Mumbai and Shankar Sharma from AIFPA, New Delhi.

Mr. Shah, briefed the participants about TQM procedure, the importance of TQM in Food

industries, and implementation of the same for the benefit of the industries. He explained the entire procedure with live examples and in local language. With the use of local language, participants understood the actual importance of the Quality Control in Food Industries. He circulated the main points of consideration for Quality Control in Gujarati for the benefit of the Participants.

Dr. Sakrikar, GM, Western Region, QAS, explained in detail the procedure regarding HACCP, its importance, implementation and the benefit from the system. He also explained in full the requirements of the Quality Management for the present market scenario and also explained what is HACCP, why it is required in the food industries, and how it is to be implemented.

Mr. Shanker Sharma briefed the participants about the activities of the Association and suggested the idea of becoming member of the Association. Majority of the participants have shown their interest in becoming members of the Association and also welcomed the idea of setting up of High Tech. Laboratory at Vadodara for Members' benefit.

20 participants from different groups of food industries took part in this workshop. They represented units manufacturing Spices,

Namkeen, Khakhara, Papad, Pickles, Canned Mango Pulp, Biscuits, Sweets etc. Press representatives were also present.

The workshop got a good coverage in the local media.

The meeting ended with a vote of thanks from Chapter Chairman.



TQM Workshop held at Nashik on 26.11.2000

The training programme on TQM System was jointly organised by AIFPA & National Horticultural Research and Development Foundation (NHRDF) at Nashik on 26.11.2000 at Kanda Batata Bhavan. The list of participants is enclosed at Annex. - I.

At the beginning of the programme, Dr. S. R. Bhonde, Jt. Director, NHRDF welcomed Shri U. B. Pandey, Director, NHRDF as Chief Guest of the programme and Dr. D. P. Waskar and Dr. Mashalkar as faculty from Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri. After welcoming the participants from various enterprises the programme commenced after tea.

In the introductory speech Sh. Shankar Sharma, Sr. E. A., AIFPA gave information on AIFPA, its function and membership as

well as programmes undertaken by AIFPA, and the publication of the journal, *Indian Food Packer* and its membership etc. The objective of the TQM system training programme was also explained by him.

Shri. U.B.Pandey, Director, NHRDF in his inaugural speech apprised the participants about horticultural industry which is fast growing in India and simultaneous need for development of processing industry. The lack of knowledge on Quality Control is seen creating hindrance in the competition in National and International markets for processed food products. The introduction of new processed products and quality control would help the farmers as well as processors. He commended the efforts taken by AIFPA in organising this training at Nashik as a right step in this direction.

Later on Dr. D. P. Waskar of MPKV, Rahuri gave information on various food and vegetable products and their processing values and also quality concepts for maintaining their food value, nutritional value and medicinal value in many of the products.

Dr. S.D.Mashalkar gave information on dehydrated products and their importance in food as also care to be taken while processing the dehydrated products from many vegetables. The scope for new products of fruits and vegetables was discussed.

Dr S.R.Bhonde explained to the participants the quality control concepts applied to food industry and showed the slides on fruits and vegetables marketed on large scale.

There was good deal of interaction between participants and the experts and fruitful discussions were held during this programme. The assessment form was got filled from the participants which indicated that the participants from food processing industry were benefitted by the programme and desired that AIFPA should arrange more such workshops on several aspects including marketing, Govt. Schemes available and facilities provided by Ministry of Food Processing to the food processors particularly small enterprenuers. The representative of Maharashtra centr for Entrepreneurship Development informed that they can help AIFPA to arrange such programmes in Maharashtra at different places as they have districtwise net work.

Sh. Lallan Singh, Addl. Director, NHRDF gave the vote of thanks.

The programme ended after lunch to the participants.



TQM Workshop at Hyderabad on 20.12.2000

One day Workshop on Total Quality Management Systems for Food Processing Units was jointly organized by All India Food

Processors' Association, New Delhi and Andhra Pradesh Industrial & Technical Consultancy Organisation Limited (APITCO), Hyderabad on 20th December, 2000, at Hotel Quality Inn Residency, Nampally Station Road, Hyerabad.

The workshop was attended by 27 delegates including 3 from APITCO and 1 from APEDA.

INAUGURAL FUNCTION (9.30AM TO 11.00 A.M)

Shri S. Srinivasa Rao, Managing Director, APITCO welcomed the gathering an appreciated the interest of delegates in attending the workshop with a short notice.

Keynote address was delivered by Shri Surendra Kumar Sood, Food Scientist and President of Andhra Pradesh Food Technologists' Association. He explained the concept of TQM in general and the importance of TQM in today's global market environment.

Presidential address was delivered by Dr. C. Venkata Ratnam, a note Food Processing Specialist and Chairman of Andhra Pradesh Agri-Hroticultural Society. In his 60 minutes speech, he explained the importance of Total Quality Management Systems in Food Processing Sectors. He shared his world level experiences as a World Bank Consultant and his practical experience with different Food Processing Majors world wide and their quality consciousness.

PRE LUNCH SESSION (11.30 A.M TO 1.30 P.M)

There were two speakers in the pre-lunch session. First speaker was Shir S. K. Sood, Food Technologist. he presented a paper on "Need for Safe Food Production". He briefed the delegates on Food Safety Measures in storage of raw material and up-keeping of processing area. His low-cost or no-cost advices were ell received by the delegates.

The second speaker in pre lunch session was Shri Dilip Kumar Das, Asociate Consultant of APITCO. He explained the role of TQM in Food Processing Industries with his industry experience and

implementation of TQM systems in other industries.

POST LUNCH SESSION (2.00 P.M. to 6.00 P.M)

Shri Kawle of Bureau of Indian Standards, Hyderabad explained the basic quality requirements of Food Processing Industry. He also clarified the queries of delegates on ISO-9000, Bis and Agmark standards and related issues.

The second speaker was Shri M. Venkata Raman Reddy, Chief Consultant of M/s Food Quality Management Services. Hyderabad.

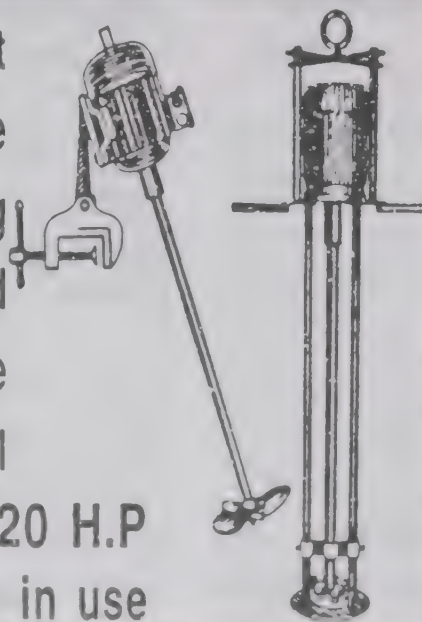
He presented a paper on "HACCP-bassed Food Safety Management Systems". He showed a video film on implementation of HACCP in Food Processing Sector followed by a clarification session. The delegates had actively interacted with Mr. Reddy on HACCP implementation.

Finally, Shri A. Sudhakar, Asst. Director, APEDA explained various schemes of assistance from APEDA for implementation of Total Quality Management of HACCP in Food Processing units.

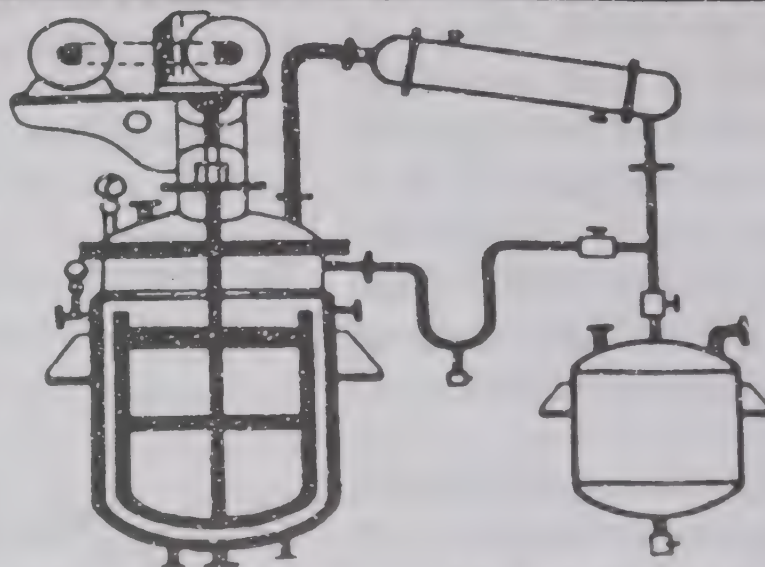


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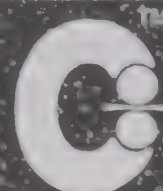
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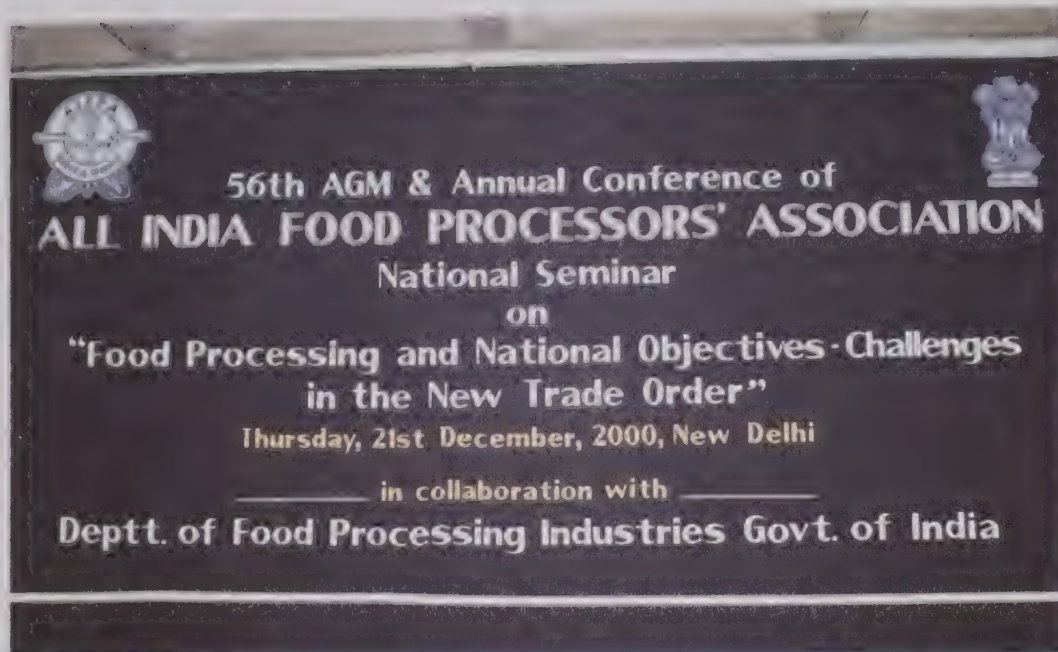
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Executive Committee Meeting of AIFPA in progress



Annual Conference of A.I.F.P.A



Registration of Delegates



Badge being pinned on Hon'ble Minister for FPI,
Sh. Th. Choaba Singh



Minister being escorted by Sh Kejriwal & Sh. Dhillon



Sh. K. P. Sareen, Executive Secretary compering the programme.



Sh. Gokul Patnaik, President, AIFPA presenting bouquet to Minister



Sh. Patnaik presenting bouquet to Sh. Omesh Saigal
Secretary, DFPI.



Minister lighting the lamp



Secretary lighting the lamp



Sh. Patnaik giving the welcome Address.



Minister giving the Inaugural Address





Secretary giving the Key Note Address



Dr. S. Jindal announcing Assn. Awards for 1999



Sh. P. M. Sinha of Pepsi receiving Kashalkar Award



Dr. V. Prakash, Director, CFTRI receiving S. K. Mitra Memorial Award



Sh. V. Prahlad receiving the Subhkaran Jatia Memorial Award given to Sh. S. N. Prahlad



Sh. D. S. Chadha receiving Ganesh Food Products Award



Dr. S. K. Saxena, Director, FRAC receiving Association President's Special Award



Secretary, DFPI looking at the citation



Sh. Patnaik presenting bouquet to Sh. Kumar Bhatia, Director (F&V), DFPI



Sh. Patnaik presenting banquet to Sh A. K. Goyal,
Director, DFPI



Sh. Patnaik presenting bouquet to Sh. R. K. Bansal, DFPI



Sh. Patnaik presenting bouquet to Sh. N. Rasool, Addl,
Indl. Adviser, DFPI.



Minister discussing with Sh. Sareen



Secretary in conversation with Sh. Dhillon



Sh. P. N. Narang, Senior most Member of AIFPA
presenting memento to Minister



Sh. Patnaik presenting Memento to Secretary



Sh. Patnaik presenting Memento to Jt. Secretary,
Dr (Ms). Vibha Puri Das



Sh. Radhakrishnan, Chief Editor announcing the IFP
Awards for 1999



Dr. Shivhare, Scientist GNDU University receiving N.N. Mohan Memorial Award for best research paper



Dr. S. C. Mandhar, Scientist, IIHR receiving the Dr. Pruthi Award for New Machinery development



Miss Pranamika & Miss Seema Bhatia of Delhi Inst. of Hotel Management & Catering Technology receiving best student's award



Miss Seema Bhatia of Delhi Inst. of Hotel Management & Catering Technology receiving best student's award



Sh. Sareen meeting the Councillors from Russian Embassy



Sh. R. N. Gupta, Adviser, Canadian High Commission at the Conference



View of Delegates at the
conference





View of Delegates at the
conference





Sh. Ramesh Chauhan & Sh Kisan Mehta in Conversation with
Secretary, DFPI



Secretary & Jt. Sec, DFPI at Tea



Dr. V. Prakash, Director, CFTRI presenting his paper at the seminar



Dr. S. K. Roy, Scientist, (Emeritus), IARI presenting his paper at seminar



APEDA representative speaking on website created for food industry



Sh. Adhiram Sait of Pepsi receiving a Memento



LUNCH after the Conference



AGM of AIFPA in progress



REGULAR SECTION

NEWS ROUND UP

Bottle wins Can of The Year Award

A RECLOSABLE bottle shaped beverage can stole the show at the Cans of the Year award session at this year's Cannex 2000 held in Brisbane, Australia.

The winning design, from Japanese canmaker Daiwa Can, features a screw top for resealability and features polyester laminated coatings and a lightweight wall-ironed aluminium body that is light than the equivalent PET plastic bottle.

The 28 mm crew top is sealed with an aluminium cap while the bottom of the can is seamed in a conventional way.

Consumer appeal was Daiwa's main aim when development of the can began in 1996. Daiwa's objective was to make a container at high speed with minimal environmental impact. This was achieved with the use of polyester laminated coatings on the inside and outside of the can making the use of solvent-based coatings unnecessary.

The first application for the "New Bottle Can" is for Japanese brewer Sapporo's beer. Kirin, Japan's largest brewer, is also

expected to use the design.

Asia Pacific Food Industry July 2000



Enzymatic processing of berry, citrus, grape and tropical fruits

PECTINASES are used in berry processing to give increased juice yields from the mash and to allow depectinisation of the juice prior to concentration. In berry processing one critical parameter is the extraction of maximum colour and the stability of the colour in the final product.

The condition encountered in berry processing i.e. very low pH, high levels of soluble pectin and high polyphenol levels, result in high dose rates of enzyme being used in the process. It is critical that the enzyme product chosen does not contain 'anthocyanase' activity, which results in destabilisation of the extracted colour.

In citrus processing, enzymes are not used in the production of the juice, but are used in the upgrade of the waste products of the juice production line. Excess pulp is extracted in a countercurrent wash system. It is at this stage

that use of pectinase enzyme is allowed to facilitate maximum extraction of soluble solids and reduced the viscosity of the extract.

The pulpwash product is concentrated and sold as a clouding agent to the soft drinks industry. The enzymes used in this process must allow the reduction in viscosity of the pulpwash but not cause clarification of the extract. Cloudy products may also be produced from peel in a peel extraction process.

Grapes and tropical fruits

Pectinase enzymes are used in grape processing for juice production and also in wine making. Juice production is prevalent in the US where the Concord grape is used.

Macerating enzymes are used in the grape mash. Treatment with these products results in the breakdown of the cell wall components, reduction in viscosity of the fruit mash and increased recovery of free run and pressed juice. Use of the macerating enzyme also results in improvements in setting rates without affecting juice clarity. As with berry processing, juice colour is critical in red grape juice production for either juice or winemaking.

Pectinase enzymes find varied uses in tropical fruit processing. They are used in-process for reducing the viscosity of papaya, mango and guava purees. The reduced viscosity improves the pumpability of the purees.

In pineapple processing, pectinases help give improved juice recoveries from waste products of the canning line. In banana processing they are used to crystal clear juices of high brix which can be used as a natural sweetener.

Asia Pacific Food Industry July 2000



Enzymes in apple processing

Starting with apple mash treatment, the objective of enzyme treatment of the mash is to improve the pressability of the mash resulting in increased juice yields and throughout in the plant. Stored apples are particularly difficult to process because they contain a high level of soluble pectin.

Pectinases, which are developed for mashing, act on this soluble pectin dissolved in the juice. As a result, the viscosity of the juice is dramatically reduced and it can flow easily from the mash. During mashing a limited degradation of the cell walls occurs. Overtreatment can result in complete breakdown of the cell wall structure, collapse of the promace and poor pressing.

Apple juice clarification

The juice from the press is transferred into tanks for clarification. The juice is heated to 45-50°C for depectinisation. The pectinase enzymes polygalacturonase (PG) / pectin esterase (PE) and pectin trans eliminase (PTE) result in breakdown of the main pectin chain into smaller fragments.

This results in a dramatic reduction in viscosity of the solution and destabilisation of the cloud. The ratio of PG/ PE and PTE activities in the enzyme preparations are important. Preparations rich in PE are efficient since PG needs to have the methyl groups removed before it can act. However too high a PE with insufficient PG may result in the production of pectic chains which would precipitate with calcium before hydrolysis of the pectic acid.

The clarification mechanism

Clarification can be divided into 3 different phases.

1. Enzyme degradation of the pectin
2. Flocculation
3. Sedimentation.

Freshly pressed juices are stable colloidal systems. The main stabiliser is pectin. In the first phase of clarification the use of pectinolytic enzymes results in rapid viscosity reduction. At this stage only 5-10 percent of the

pectin glycosidic linkages need to be broken.

In the second stage-flocculation-the cloud breaks and clear juice is visible between the particles. Flocculation occurs because of electrostatic interaction between positively charged protein and negatively charged pectin.

Pectinases partially degrade the pectin coat, thereby partially exposing the positively charged protein. Aggregation of oppositely charged particles occurs which results in the production of flocs. These associate with other negatively charged particles such as tannins.

The sedimentation depends on the size and density of the flocs and the viscosity of the juice. The lower the viscosity, the greater the rate of sedimentation. The reduction of viscosity also facilitates the subsequent fining process.

Traditional fining is done using agents such as gelatin and bentonite. An alternative is membrane filtration using an ultrafilter membrane.

Where ultrafiltration is used it is critical that the juice is pectin free and of low viscosity. Fouling of the membranes can be a problem if large molecular weight polysaccharides are left in the juice. However, with enzymes that contain MAPase activity as described earlier, fouling is not a problem and membrane life is extended.

Total liquefaction

Total liquefaction of apple mash is not yet widely favoured in the fruit juice industry. In this process the mash is heated to approximately 50°C and treated with a high dose rate of enzyme for a period of 2-4 hours.

The total liquefaction enzymes contain pectinase, cellulase and hemicellulases and the treatment results in complete degradation of the cell wall. Juice yields following total liquefaction are very high approximately 95.98 percent.

In this process the mash is not pressed in a traditional manner. Juice separation is carried out using a decanter centrifuge. The juice produced is completely depectinised and does not need any further treatment with clarification enzymes.

Total liquefaction of apple pomace has gained popularity in recent years. Apples are mashed and pressed in the traditional way (without the use of mashing enzyme) and then the pomace is liquetied as described above.

Asia Pacific Food Industry July 2000



Ultra high pressure for food safety

A scientific partnership between Food Science Australia and US food technology firm Flow International Corporation will enable Australian

client companies to evaluate the Use of Ultra High Pressure (UHP) is safe food processing.

According to the latest issue of Food Science Australia's newsletter, the first UHP plant in Australia has already been built and work is being conducted on a flexible 2-litre unit suitable for both new product development and research studies.

The project is driven by escalating market demand for foods that retain all their desirable fresh characteristics but have the long shelf-life of processed products. Conventional methods like heat treatment (pasteurisation) and chemical preservatives tend to alter food flavour, colour and composition -features prized by consumers.

The UHP process involves placing the product in a water medium and subjecting it to high pressure of 100-800 mega pascals. Microbes are killed by the intense pressure, which damages their outer cell membranes. The food is little affected as it typically contains water, which is relatively incompressible.

The technology can be applied to many acidic products including jam, fruit juices, sauces, meats and seafood. The Food Science Australia team also plans to explore the use of pressure to replace sterilisation or canning of fruits and vegetables.

At present, UHP technology is relatively expensive (about twice

the cost of freezing) but this is expected to change. Other technical challenges are the resistance of enzymes to pressure and the presence of oxygen residue and the presence of oxygen residues in food which lead to spoilage.

According to project leader Dr. Martin Cole, these barriers may make it necessary to combine UHP with other techniques such as cool storage and hygienic packing to achieve optimum results. "But we believe the potential for greatly improved eating quality in long shelf-life foods far outweighs the disadvantage of a combined process," he said.

Asia Pacific Food Industry July 2000



Wenger new generation dryers add to a proven platform

Addressing the three-fold requirement of uniformity, energy efficacy and multi-product capability. Wenger's new generation Series VII is a dual plenum, multi-pass conveyor Style dryer offered in two basic configurations - Standard and True Temp. The Series VII Standard is a conventional multi-zone dryer able to meet precise moisture uniformity requirements and operational flexibility for a wide range of pellet and large diameter particle drying. With this combination, Wenger maintains that the dryer can pay for itself

within 18 months, under multiple product processing.

A recent innovation offering the operational features of a staged driver in a single multiple pass configuration, the Series VII True Temp saves valuable floorspace and improves overall energy efficiency. Each conveyer pass is configured as a separate heat and airflow zone, permitting 2-5 zones to be stacked in the floorspace of a single dryer stage. This properly allows for widespread application for products requiring different heat and airflow profiles.

Both configurations operate at a moisture uniformity range of ± 0.5 to ± 1.0 percent, with operational efficiencies in the order of 1,450 BTU per pound of water removed, a 10-20 percent Improvement over earlier designs. The dual plenum design makes for balanced airflow through the product from either side and quick direction changes. Applications include dehydrated fruits and vegetables, ready-to-eat cereals, extruded snacks, snack pellets and pasta short goods.

Asia Pacific Food Industry July 2000



Milk standardisation opens up dairy opportunities

Following Codex's recent move to allow greater flexibility in the level of proteins in skim milk providers,

the dairy industry in Australia and New Zealand enjoys the opportunity to maximise the value of proteins by adding lactose to standardise the milk powder. The minimum protein in milk powders has been set to 34 percent of MSNF.

This effectively means that the protein content in a majority of skim milk powders can now be 32.6 percent against 34-38 percent in the past. As a rule of thumb, approximately 4.2 percent lactose can be added to reduce the protein content from 34 percent to 32.6 percent. This equates to nearly 40 kg lactose addition to every tonne of powder, thus yielding the price differential between lactose and skim milk powder as gain.

Traditional methods of adding lactose to milk consist of the following steps :

1. Heating of water
2. Addition of lactose to make 20 percent TS solution
3. Cooling of lactose solution for storage
4. Continuous agitation of tanks
5. Evaporation of added water in evaporator
6. CIP of plant

Direct addition of lactose

These steps are expensive in terms of capital and operating costs. But one process has been developed by Saurin Enterprises which is both simple and inexpensive. This Mixing

Process has the following salient features :

1. Direct mixing of lactose with milk or milk concentrate
2. Needs no heating or cooling
3. Is an in-line process
4. Uses no water
5. Washes as part of the plant
6. Can be used to add other powders for reconstitution

Calculations are based on a skim milk evaporator handling 50,000 litres per hour. In addition to the savings gained, the plant would be able to handle 10.4 million litres of extra milk in one year.

The solution lies in a Solid-Liquid Mixer that works on the vortex principle, which draws objects using a circular spinning motion towards a vertical cavity. The Mixer uses this principle, but actively remove air rather than add air.

The Solid-Liquid Mixer technology (patent-pending) is able to meet all critical factors relating to direct lactose addition, namely :

1. Removal of interstitial air
2. Controllable dose rate
3. No addition of air
4. In-line dosing

The dose rate and composition is PLC controllable. Measurement of the milk composition is done

before the dose point and the dose rate is controlled by feed forward loop.

The Solid-Liquid Mixing process is also applicable for the following products:

1. Addition of powdered activated carbons to liquids
2. Addition of lecithin to oil
3. Emulsification of liquid lecithin equivalents in water
4. Addition of other additives like milk salts in milk
5. Hydration of casein

Asia Pacific Food Industry July 2000



DST scheme to enhance food output

The department of science and technology has embarked upon a Rs. 100- crore project aimed at making India self reliant in food production and major sectors of agriculture by 2020.

"Following the hike in science budget this year, we are working on a roadmap to priorities\ programmes in the bio-technology and genetic modification sectors to meet standards set by the 'Technology Vision 2020' document," said the DST Secretary, Prof. V.S Ramamurthy.

The scheme envisages targeted programmes worth Rs. 50 crores to enhance research in various areas

of food productivity. The council of Scientific and Industrial Research (CSIR) has been allocated a sum of another Rs. 50 crores to enhance research in various areas of food productivity. The Council of scientific and Industrial Research (CSIR) has been allocated a sum of another Rs. 50 crores to take up research on bio-diversity and to create effective ' laboratory to market' interfaces to reach the benefits of such research to the people.

Besides core areas of food production, the scheme would also focus on the dairy sector with a systems approach to better quality of milk produce, yield and cattle research . A lot of technological solutions are being worked out to improve the milk production.

Agriculture Today October 2000



Horticulture output soars in MS

The Maharashtra Chief Minister, Mr. Vilasrao Deshmukh stressed that the state has successfully brought an area over 10 lakh heactare under horticulture plantation of 19 fruits and the production has exceeded 60 lakh tonne.

High priority must be accoded to proper handling, processing and marketing facilities to this ever-increasing production, added the minister at a seminar by the

Department of Food Processing Industries and the Federation of Indian Chamber of Commerce and Industry.

The seminar was held for eliciting the views of the state government on the approach of paper for the formulation of a national policy on foodprocesing industries.

Agriculture Today October 2000



Pepsi to contract tomato farming in Karnataka

The Pepsi Foods Ltd., (PFL) is planing contract tomato farming at Nelamangala located at about 40 km from Bangalore. Off-season testing of about 18 hybrid seeding material is already underway.

A senior PFL official said the seeding material would be supplied to the contract farmers by September or October to facilitate rabi cultivation . The produce is expected to be harvested from next January.

According to the official the entire output would lifted by PFL for producing tomato puree. Initially the project would be restricted to around 300 acre (producing around 10,000 tonnes). If the project goes as scheduled more contract farming is likely in the next two-year down the line.

The company plans to make

available high -quality seeding material right at the farmer's doorstep. The PFL's procurement price would also be at a premium compared to the ruling market price, the official said.

The PFL has also been harvesting fruits like mangoes, guava, banana, grapes and papaya (mainly for processing) on a five-acre land near Nelamangala.

Besides the fruit and tomato cultivation programmes, the PFL is also exploring prospects of contract farming in groundnut in Karnataka.

The programme is likely to be started in the Kolar district. The area in and around Kolar has the ideal soil condition for groundnut cultivation in the state, the official added.

The PFL also plans to cultivate more groundnut in Punjab.

Under its groundnut contract farming programme, farmers in Punjab have been able to obtain average yields of about 1.5 tonne per acre as compared to the national average of about 0.4 tonne per acre.

Agriculture Today October 2000



An alarm system for spoiled meat

Technology used to sniff out narcotics and explosives in airports is now being developed to detect harmful bacteria in food samples.

The goal is to devise a rapid, sensitive test that detects contaminated meat products before they are shipped from a central processing plant to points across the country.

Over the past 40 years, scientists at Barringer Technologies, a company based in Warren, N.J., have developed equipment that can detect volatile compounds such as TNT. The technology differentiates materials based on how quickly the ions move through an electric field.

Working with researchers from the University of Connecticut, the company has adapted its technology to detect minute levels of bacteria as few as 10,000 bacterial cells in a culture of millions or billions for a meter 25 per sample.

In field tests last year, Barringer's device detected *Listeria* as well or better than other commercially approved technologies, which cost about \$9 per sample.

Barringer plans to begin manufacturing its bacterial reader sometime in 2001. The machine comes with a hefty price tag - around \$40,000. But execs say that's trivial compared to the misery and costs of an outbreak.

Economic Times 29.10.2000



Scientists evolve eco-safe pesticide

Washington: An international body of scientists has developed an

environmentally safe pesticide to fight crop-destroying locusts and grasshoppers. The new pesticide, developed by the Nigeria-based International Institute of Tropical Agriculture (IITA) as part of an international research consortium, uses a naturally occurring fungus that is deadly to locusts and grasshoppers, but does not damage other insects, plants, animals or people. IITA scientists developed the natural pesticide over a 10-year period and will report the advance as part of the International Centers Week 2000 conference at the World Bank this week in Washington, D.C. The first commercial release involving the largest aerial spraying of bio-pesticide ever conducted in Africa - indicated that it remains effective up to three times than chemical pesticides.

Economic Times 29.10.2000



Microwave / Heat pump batch dehydration system & Single /Double unit dosing system

The above is a new concept developed by HRD Pumpen- und Dosiertechnik GmbH, Germany of volumetric dosing of purable dry pastelike and liquid products and hot drying of a vast range of products such as vegetables, meat, fish, pharmaceuticals etc without causing damage to the products and its colour, flavour and texture. The new process results in

significant savings of drying time and power consumption. In general, reduction times over normal systems amount to maximum 50%

The benefits: Lower drying temperatures, much faster drying, lower energy levels. Investment : around DM 5,00,000.

For further details, M/s Hestonhill (S) P. Ltd., 8, Robinson Road, #06-00 Cossco Building, Singapore 048544, Tel. NO. 0065-7835216; Fax 0065 -7835218; E-mail heston/hi@singnet.com.sg maybe contacted.



Apeda plans chain of packhouses in N-E

The Agricultural and Processed Food Products Export Development Authority (Apeda) plans to set up a chain of packhouses in the North-Eastern region to ensure proper quality of agro-food products. It has also requested the North Eastern Development Finance Corporation (NEDFL) to study the feasibility of the project.

Apeda sources said pack-houses had become a necessity in the north-eastern region to maintain the quality of agro-food products manufactured here. Besides providing cold storage facilities, they can also provide processing and packing facilities in favourable conditions that reduce the wastage of raw materials.

With the availability of

refrigerated trucks in the region, the raw materials can be easily transported to the packhouses for processing and packing before being sent off to the markets.

One of the target products under the project is orange which is grown in abundance in the region. Though the product is of prime quality, trade in orange is totally unorganised. As many as six agents handle the product from the orchard to market. The project, when implemented, will streamline the distribution chain besides eliminating the agents.

The agency intends to set up one pack-house initially in Upper Assam at a cost of Rs. 1.5-2 crore houses in other places of the region. It also proposes to organise a workshop in December in collaboration with the State Agriculture Department to promote the idea.

The Apeda project to develop model organic farms in the region is progressing satisfactorily. Under this project, Joha rice and sugarcane are being grown in Assam passion fruit in Manipur and pineapple in Maghalaya and Tripura.

Selected NGOs have been coordinating these model farms through land owning farmers. A team of certifying agency members will soon visit the farms and certify the organically grown food products for export to the West.

The Hindu

01.11.2000



European food retailers test waters

Leading European food-retail chains Carrefour of France, Ahold of Netherlands, and another French company Casino are planning to enter the domestic market in view of the growth opportunities in the sector.

Merchant banking sources said that all the three have begun to test the waters and will have to identify local partners as the government does not allow more than 49 per cent foreign direct investment in the sector.

According to sources, the reason behind the overseas chains making a foray is that the European markets have saturated, while recent studies done on the nascent Indian market has shown that it can triple every two - years. The organised food retail market is estimated at only 1 per cent of the total food market, constituting around Rs. 600 crore of food sales. The organised food retail market is expected to grow 12 fold to Rs. 7,500 crore over the next five years. However, high real estate costs have until now led to an almost negligible presence of the organised retail industry in the most industrialised western part of the country Mumbai and Gujarat.

Till now, only two foreign players are present in the country Dairy Farm of Hong-Kong and Nanz of Germany. Dairy Farm,

along with the RPG group, are jointly promoting the service super market chain Food-world.

Food-world has taken the lead in addressing the retail opportunity in the south, with 45 stores in 5 cities and has notched up sales of Rs. 1.6 billion in 1999. Nanz has come to India in collaboration with Escorts and Goetze and has 8 stores in Delhi. Operational problems have resulted in the chain having discontinued its franchisee outlets, the existing stores are yet to break even. The Nandas are understood to be looking at the option of exiting from the venture.

According to a recent study conducted by investment bank Rabo Indai Finance, the net profit margins are around 2 percent and gross margins are 19 percent, but the return on capital employed is around 17 per cent. However, the government does not allow 100 per cent foreign direct investment for retailing except for cash and carry formats.

Business Standard 07.11.2000



Ten-year tax holiday likely for food processing

The government is considering to give a 10-year tax holiday to the food processing sector in order to boost investment in this sector.

According to an approach paper

prepared by the department of food processing, this sector needs investment to the tune of Rs. 1,40,000 crore, including foreign investment.

The approach paper on national food processing policy was unanimously accepted by the parliamentary consultative committee of the ministry of agriculture at its meeting held in Bangalore last Friday under the chairmanship of agriculture minister Nitish Kumar. A detailed meeting in this regard is slated to be held shortly.

Thrust of the policy is to, increase food processing from the present 2 percent to 10 percent, tax holiday for ten years, enactment of food processing development act, generic promotion, strengthening data base and special provision for the north eastern region hilly areas and islands in the short term.

The salient features of the policy are establishment of R&D institutions' network identification of anchor industries and development of food parks, establishment of cold chain and development of related infrastructure development and transfer of new technologies and product specific packaging future trading and equalization of fund and exports.

Confirming that the government is seized of the policy initiatives on the sector, food processing department secretary Omesh saigal told the Financial Express, "the enhanced investment

(of Rs. 140,000 crore) would generate direct employment for about 77 lakh persons and indirect employment for some three crore people.

According to figures available with the government, growth in fruits and vegetables is 6 per cent as against the 3 percent food grains. But the market surplus in fruits and vegetables is 90 per cent as against just 15 to 20 per cent in food grains. It is imperative, therefore, that fruit and vegetables sector is crying for marketing mechanism. This is possible only through large scale investment.

One of the biggest disincentives in the growth of the food processing sector has been the tax structure. When excise duty was first levied on processed food in 1997-98 it was just 8 per cent. Last year, however, the rate was hiked to 16 per cent, As a result, investment in the sector became a big casualty.

According to the department of food processing the sector attracted an investment of about Rs. 10,000 crore between 1991-92 (when the sector was delicensed) and 1996-97 (when no excise was imposed.) It declined soon after, following taxes/levies. Hence, the need for a tax holiday, the department has pressed.

Significantly, the government is simultaneously working on a processes food development act which is expected to provide a single window system and would move from regulatory penal regime

to that of promotional and developmental mechanism. The argument is that it would serve the interests of the Indian food industry and make it viable and competitive.

Observer

10.11.2000



Indo-French joint venture for manufacturing semi-candied fruits

For the first time in the country, an Indo-French joint venture has set up a fruit in order to exploit the vast export potential for this value added product in Europe, US and middle-east.

The 6.5 crore joint venture at Rampur in UP between Infragro Industries Ltd., and CIRAD (Center de Cooperation Internationale en Recherche Agrohominique), a semi government French Research and Development Institution, which has patented the dewatering and impregnation soaking process, has already commenced operations.

Talking to this paper director Infragro Industries Avinash Verma said that the company had already started exporting semi candied fruits and was confident of crossing a target of 5 crore within two years of operation. "We are confident of booking our within two years of operation. " We are confident of booking our total capacity by 2001, he said.

Observer

10.11.2000



5 lakh ton cold storage capacity created

The government and the private sector have jointly created 5,00,000 tonnes of additional cold storage capacity for horticultural produce under a capital investment subsidy scheme launched by the ministry of agriculture last year.

The progress so far has been very satisfactory. We have been able to create additional 5,00,000 tonnes capacity for horticulture produce. These new cold storages have been established in Maharashtra, Madhya Pradesh and Karnataka under the supervision of the National Horticulture Board (NHB), horticulture commissioner HP Singh told the agency.

The Central government had sanctioned Rs. 1.75 billion for creating 1.20 million tonnes of cold storage capacity and upgrading 8,00,000 tonnes of existing capacity to reduce post harvest losses of horticulture produce. In addition, 4,50,000 tonnes of cold storage capacity will be set up for onions to avoid a repeat of the crisis two years ago when prices crashed after a bumper corporation.

Around Rs. 500 million has been utilized for the 1992-2002 scheme of the NHB, which also envisages private sector participation of Rs. 5 billion. "We are in the process of evaluating several new proposals which will be finalized soon," Mr. Singh said.

The new cold storages are

being made to NHB specifications for maintaining horticulture produce at varying temperatures. In the case of potatoes, it has been fixed at 12 degree celsius, with the use of special chemicals in some cases to check sprouting for a longer shelf life.

"As much as 90 percent of the new cold storage capacity is being earmarked for potato storage's as the current facility is not suitable. Most of the old cold storages are equipped to maintain temperature at two to three degrees Celsius, which is more suitable for seeds , " H.P Singh said.

India had the highest potato yield of 2.35 million tonnes this year, compared to around 2.10 million tonnes in 1998.

On reports of potatoes lying in plenty in cold storages without any takers, Mr Singh said, " This year a number of people have put in potatoes in cold storage . Unfortunately, there are not enough takers and the price is not up to farmers expectations"

"Indian exports of potato to countries like Mauritius, Bangladesh, Sri Lanka and the UAE are just 0.3 per cent of our production. We have identified Iran, Malaysia, the Philippines and some east European countries as potential markets of exports, " he said .

A small quantity of processed potato is currently being imported in India, primarily as forezen finger chip for the hospitality sector. Through there

is no restriction on potato imports, a major deterrent is the high 45 per cent import duty, Mr. Singh added.

The horticulture department is hopeful of Indian farmers being able to cater to this market once the two new varieties of potato- *Kufri* and *Chipsona* -developed by the Shimla based Central Potato Research Institute is taken up for cultivation on a wider scale.

The *Kufri* and *Chipsona* variety of potato have a lower sugar content and are ideal for frying without turning brown too quickly as is the case with most of the 37 varieties of potatoes cultivated in the country, Mr. Singh said -IANS.

Observer 10.11.2000



TN policy to stress on food processing

Special thrust would be given to food processing industry in the food policy of the Tamil Nadu government, to be finalized by this year end, a top official of Tamil Nadu Agro Industries Development Corporation said on Thursday.

Suggestions from farmers, non-governmental agencies and entrepreneurs had been considered while preparing the draft policy and after the government's approval, it would be announced within this year, Corporation managing director Ujagar Singh told reporters here

Having already set up 27 food

processing training centres in the state, the Tamil Nadu Agro industries Development Corporation had recommended establishment of 17 more such centres at a project cost of Rs. 51 lakh.

On the projects in the pipeline, he said a coconut processing center at Kanyakumari and a fruit processing center at Krishnagiri were among those taken up at a cost of Rs. 31.48 crore.

The corporation would hold 11 per cent equity in these projects

Observer 17.11.2000



Govt builds a Great Wall to shield domestic industry from imports

Operation salvage has begun. The contours of a four pronged strategy to protect domestic Industry from cheap imports has emerged. One, the government has hiked the import duty on edible oil; two, it has ordered anti-dumping investigation into select imports from China, three, it's laying down the standards for imported goods and four, it's making licensing compulsory for all imports.

The protection to oil millers is direct through the tariff route. Duty on palm oil imports has been hiked to 65 per cent from 35 per cent, while the duty on other

edible oils has been raised to 45 per cent. The other measures are indirect. While the anti-dumping probe into Chinese imports of toys, sport shoes and dry batteries holds out promise to the beleaguered small units, an order expected in a couple of days, to make BIS standards and printing of prices in rupees mandatory, would make it difficult for many to sell goods cheaply in India.

At the same time, the government hopes to have complete information on who is importing what by introducing licensing of imports. This is not quite a barking back to the license permit Raj licensing of imports is allowed under WTO norms. Under the norms, the government won't deny the licence to any body. It will only ask for information and prior notice.

The message that the government has put out to domestic industry is clear dumping won't be permitted and if it takes place, Bharat Sarkar will act. Industry has reacted by welcoming the move to set down standards and has urged the government to carry out its anti-dumping investigation with due care so that lack of evidence does not weaken the case.

As for these investigations, this is the first time that the anti-dumping mechanism has been activated against consumer goods. It's significant that the probe has been ordered without any formal complaint from the domestic industry.

When contacted by ET, minister of state for commerce Omar Abdullah said the investigation has been launched under special provisions of WTO norms which allows suo moto investigation

Economic Times 20.11.2000



Gujarat announces agro-industrial policy

Gujarat has announced the first ever Agro-Industrial Policy for development of agro-based industries in the state.

The announcement of the policy was done by the state minister for agriculture Becharbhai Bhadani on the last day of Agri Fare 2000, here last week.

The newly framed policy extends a back-ended interest subsidy of 6 per cent per annum on longterm loans for agriculture infrastructure development with a ceiling of Rs. 400 lakh. This includes projects for agro and food parks, supply and cold chain, retail outlet chains for perishable products, agri jetty, transportation hub, transit and terminal market, technology incubation and demonstration center and a variety of other related aspects.

A similar 6 per cent back-ended interest subsidy on long-term loans (with a ceiling of Rs. 100 lakh) is also held out to make investment on agro industrial units

in Gujarat internationally competitive.

The state government also proposes to bear 50 per cent of the cost for preparation of a project report for the same purpose.

Speaking on the policy, the minister said, "A comprehensive separate policy was necessary to make agriculture in Gujarat a world class producer and supplier in identified thrust crops like castor, cotton, groundnut, sesam, banana, potato and onion by adopting an integrated approach"

He added that the policy was also essential because only processing and manufacture of agricultural produce is not enough." The whole system has to have a backward linkage of food chain right up to the farm. The agro-industrial policy policy therefore links farm to the market and vice-versa. The policy shall attempt to metamorphose agricultural sector into a vibrant and competitive agri-business," he added.

"Land is crucial for agri business the state government shall issue guidelines for simplification and expeditious clearance of project for research and development, demonstration farms, nurseries and the likes. The state government also intends to provide government land including agriculture farms on long lease basis," informed Bhadani. To ensure accelerated development of agro-industrial units the state government promises to

provide single window clearance for projects and has appointed the Gujarat Agro Industries Corporation (GAIC) Ltd., as the nodal agency for implementing policy.

The newly-framed policy outlines promotional plans for centres for excellence much like the Indian Castor Research and Development which was inaugurated by chief minister keshubhai Patel on Thursday at AgriFare 2000. A 50 per cent contribution within a ceiling of Rs. 5 lakh has also been extended for quality assurance programmes and patent registration for agricultural produce and crops.

To boost export of fresh fruits and vegetables a subsidy of 25 per cent on air freight charges with a ceiling of Rs. 10 lakh per exporter too was announced along with an assistance of up to Rs. 50,000 per exporter for developing a market abroad. Assistance of up to 50 per cent (within a limit of Rs. 20 lakh) has been extended to encourage sponsored research and development by reputed research institutes.

Economic Times 22.10.2000



Two biotech parks to come up in Kerala

Kerala is soon going to have two biotechnology parks that will be a source of aromati and medicinal plants. Also planned is a health sector, an industrial enzyme

sector and of course and agriculture sector. The parks proposed by the Kerala Infrastructure Development Corporation (KINFRA), will be located at Kalamassery in Kochi and Mylam in Thiruvananthapuram. "Project cost will be shared by the Center and the state," KINFRA managing director G. C. Gopala Pillai said. The Project has been approved in principle by the biotechnology department at the center. The 50 acre Kalamassery park is estimated to cost Rs. 215 million (\$4.8 million) and the estimated cost for the 16 acre Mylam project in Rs. 95 million (\$2.15 million). The state will be spending 160 million and 60 million respectively for the proposed projects. The Central government will be releasing a token amount for the projects immediate and the rest of the amount will be allotted in the next financial budget.



Food Adulteration ACT Amended

New Delhi 12 December. The government has amended Prevention of Food Adulteration (PFA) rules making it mandatory to indicate on the labels of packed and bottled food articles details of the manufacturer, manufacturing unit and the importer.

Currently labels contain the address of the registered office of the manufacturer or even a shorter address of a manufacturer without providing adequate information to

the consumers and the authorities responsible for food safety.

Therefore, the name and complete address of the manufacturer and his unit, and that of the packing and bottling unit, in case this is done separately even through franchise, would now have to be indicated on the label, an official release here said today.

Similarly, the name and address of the importer would have to be indicated on the label of imported foods and if imported food is packed or bottled in India, the country of origin of the food articles and the name and complete address and country of origin and the name and complete address of the importer and the premises of packing or bottling would also have to be mentioned, it said.

These additional requirements were found necessary to facilitate expeditious identification of the source of the problem when any issue concerning food safety needs to be addressed or monitored.

Economic Times 13.12.2000



E.U. food safety norms to pose challenges

Kochi Nov. 15. The latest European Union (E.U.) effort to put in place a comprehensive food safety mechanism, christened the 'Farm to the Table' policy, is likely to exert pressure on the country's food processing sector, especially

the billion-dollar seafood export industry.

The E.U.'s latest quest is for establishing a Food Authority and introducing radical changes in its safety and hygiene rules. The E.U. Parliament, last week began discussions on a white paper on the issue prepared by its Commission for Health and Consumer Protection.

Mr. Davin Byrne, Commissioners for Health and Consumer Protection, has described the white paper as "the most radical shakeup for 25 years of the Community's food safety and hygiene rules". Under the proposals, briefly called the 'Farm to the Table' policy, "food operators right through the food chain will bear primary responsibility for food safety".

The E.U. Commission felt that recent crises has undermined public confidence in the capacity of the food industry and of the public authorities to ensure that food was safe. And so, the E.U. had identified food was safe. And so, the EU has identified food safety as one of its top priorities. The white paper on food safety set out "plans for a proactive food policy", said information posted at the site of the EU commission for health and consumer protection.

The priorities of the white paper were: to establish a European Food Safety Authority to consistently implement a 'farm to table' approach in food legislation

and to establish the principle that food operators had the primary responsibility for food safety. Key proposals in this context were: regulation on hygiene, regulation laying down specific hygiene rules for food of animal origin for laying down controls on products of animal origin meant for human consumption and proposal for a new and integrated approach towards official feed and food controls - to be presented in July next year.

The new E.U. move is afoot at a time when the Indian seafood industry is struggling to meet the Hazard Analysis Critical Control Point (HACCP) norms and the current E.U. prescriptions on food safety. This, once again underscores the need for India to evolve a comprehensive food safety and quality assurance policy.

The E.U. countries accounted for 19 percent of the total export of Indian seafood during the last financial year. A total of 65,315 tonnes of processed seafood worth Rs. 905 crores was exported to these countries during the year.

Apparently, India's response to the challenges of food safety had been marked by kneejerk reactions and piecemeal solutions. Experts in the field say that India has failed to evolve an indigenous method of assuring quality and food safety. While "we are eager to follow instructions, verbatim, from the Food and Drugs Administration of the U.S. and the E.U. there are no efforts to look at those standards

realistically," says Dr. N. Anandavally, FAO consultant on HACCP.

She pointed out that from the time when the E.U. first banned seafood imports from India in 1995 to the current year, the Indian authorities and the Indian food processors should have displayed enough resilience to meet the challenges posed by these quality norms.

According to Dr. Anandavally, the situation had to change radically and quickly if India was to be part of the burgeoning world market for processed food, especially processed seafood. India's efforts should centre around indigenisation of the standards. For instance, she said, tropical countries could not work without a certain level of chlorine in the water. It was up to the authorities to convince the importers of Indian food about the compulsions and the ground level realities.

Thailand, she pointed out, had achieved greater success with E.U. norms because it was able to find a standard of its own. Thailand today has nearly 300 E.U. approved seafood processing plants whereas in India there are only about 80 E.U. approved seafood processing plants out of a total number of nearly 400 plants in the State.

Sources in the Marine Products Export Development Authority (MPEDA) said that the authority's representative in Brussels was watching closely the discussions on

the farm to the table policy white paper. They indicated that the new norms being discussed by the E.U. Parliament would be comprehensive but may not be more stringent than the standards being implemented in the country in the sea food processing units now.

According to the sources, the new norms would have a greater bearing on other food processing sectors in the country as safety and quality norms were not being stringently imposed on these sectors currently. The seafood processors were the best equipped in the country now to meet the standards set by the E.U. they claimed.

Hindu

16.11.2000



Indian dairy sector gears up for international competition

The Indian dairy industry is gearing up to address the environment and quality related issues to meet international standards. The 2nd international conference on 'Emerging Trends in Dairy Industry' opened today to discuss the dairy economics of the world.

Mr Bhupender Mathur, director, National Dairy Research Institute highlighted that after a long period of latency major polymer manufacturers are entering the arena of bio-degradable plastics.

The costs are falling and

packaging material has significantly improved. An interesting application was edible films and coating on food products to preserve and even enhance quality.

Mr. Sohrab, chief executive, Quality-care explained the Hazard Analysis Critical Control Point (HACCP) system which India has adopted being a signatory to the Sanitary Phyto Specifications (SPS) of the WTO. However, questions about the legal status of HACCP remained unanswered. Ms Shobha Koshy, director, PFA, Ministry of health and Welfare, stated that the Centre intends introducing registration of food commodities being imported.

The challenges being faced by the India; dairy industry are the quality of milk, low yield, animal health and corruption. This was stated by Mr. Tikku MD, National Dairy Development Board.

The other threats are phyto sanitary measures and subsidies of developed countries, which are hitting out at the developing countries.

Speakers at the 2nd international conference, highlighted that the Uruguay Round formula allowed the developed nations to inflate the tariff equivalent of earlier non tariff measures, thereby minimizing the reduction in tariffs for sensitive products.

Hindu 5.12.2000



Long way to go for India on retail front

Food and grocery retailing is evolving at a fast pace, but processing, delivery logistics and investments in the retail front will be required to revolutionise the sector, according to Mr Arvind Singhal, Managing Director, KSA Technopak.

India's food expenditure is \$77 billion, largely in the unorganized sector, as against a world food spend of \$4,000 billion. "The organised sector is on the threshold of rapid expansion," Mr Singhal told delegates at the International Conference on developing India's cold chain infrastructure in Mumbai.

He said a study done by KSA Technopak has revealed that 45 percent of people plan to spend more time in grocery shopping in the next one year and 29 percent in eating out.

"Higher income and exposure to global lifestyle have changed Indian's outlook to food," he said.

Bolstered by the growing demand, international cuisine eateries and food companies, including Domino's, McDonald's and Pizza Hut, are planning "aggressive" expansion. Additionally, there is an emergence of specialty food chains - Barista, Qwiky's 42 coffees and Coffee Day, Mr Singhal said.

Among the Indian corporate planning, an entry in food retailing, are Nirma, Adani Exports Ltd.,

Vam Organic and Hindustan Lever Ltd. Nirma, which has launched a 5,500-sq ft store, Radhe Super Market, in Ahmendabad is planning to open 4-5 new stores.

Adani, which recently acquired a 2,500-sq ft store, V. Ravji's supermarket, in Ahmedabad is planning a nationwide chain of modern formats, Mr Singhal said.

According to him, the increasing number of modern outlets would lead to dampening of the inflation rate, "Price fluctuation of commodities will be reduced as chains would have firm and relatively long-term price and quantity contracts. Besides, multiple vendor sourcing by each retailer will further neutralise regional fluctuations," Mr Singhal said.

However, modern retail chains are yet to enter into perishables. But, inclusion of perishables in assortment by modern retail chains would drive the demand for efficient cold chain, Mr Singhal said.

Industrial users, according to him, would drive the development of cold chain in the initial years. McDonald's is estimated to have spent Rs 300 crore and Amul Rs 100 crore in cold chain. Secondary growth drivers will be logistics providers, financial institutions and the Government. Tax policies and infrastructural support from the Government will facilitate in the growth of this sector, Mr. Singhal said.

Hindu Business Line 6.12.2000



Govt to invite Eols for grains handling facilities

The Government will soon invite expressions of interest (Eols) from private parties for the construction of bulk grains handling facilities across the country with an initial capacity of 30 lakh tonnes estimated to cost around Rs, 4,500 crores.

"The Ministry of Consumer Affairs, Food and Public Distribution along with the Food Corporation of India (FCI) will issue advertisements inviting Eols from individual private parties as well as joint ventures latest by December, 31, 2000". Official sources told PTI on Tuesday.

Hindu Business Line 6.12.2000



Foreign Tie-up for U.P. Food Parks

The upcoming five food parks would be set up in Uttar Pradesh for exports promotion of agricultural goods.

The inflow of foreign investment would also help the state in meeting its short-term agricultural exports target of Rs 16 billion by 2001-02 which it has set for itself.

Currently, the government has identified Haldwani, Saharanpur, Lucknow, Allahabad and Hapur as ideal locations for the upcoming food parks and the Uttar Pradesh State Industrial Development

Corporation (UPSIDC) is preparing a feasibility report for the venture, official sources said.

The areas have been identified as they have an abundant support of raw material ranging from cereals to fruits and vegetables, which are required to sustain any food park, sources said.

Moreover, the above cities are also ideal from the point of view of their proximity to wholesale markets. Sources said these areas would be able to provide cold chain facilities which are an essential requirement for handling perishable goods.

The proposed agro-industrial parks would offer common facilities for supporting and sustaining growth within the complex industry specific infrastructure for the processing units thereby helping them in becoming competitive and self reliant. Cold chain storage, water supply and drainage, uninterrupted power supply and other utilities, would be proposed in the food parks.

The food parks are partnered by various central institutions like the Department of Food Processing, National Bank for Agriculture and Development (NABARD), Agricultural and Processed Foods Export Development Authority (APEDA), Exim Bank and the State Government.

Processed Food Industry Nov.2000



Canada seeks investment in food processing

Canada has invited Indian entrepreneurs in its food processing industry while also attempting to increase its market share in the subcontinent through exports.

"Indians setting up units in Canada will have the added advantage of not only the cheaper power and skilled labour, but also an easy access to the neighboring USA market", Mr Zulfi Sadeque, counsellor (commercial) at Canadian High Commission, told Newsmen at New Delhi.

Products from Canada are allowed easy access in USA and can be exported to the country without duties thereby allowing producers an access to a ready market, he said. They can also export it back to India as the market for processed food products in the sub-continent is likely to grow significantly.

Processed Food Industry Nov.2000



Food Processing Policy on Anvil

The national food processing policy will be announced shortly. The government is also considering the declaration of tax holidays, new law for food processing, creation of equilisation fund and other measures to help farmers. Level of food processing in India, which is the second largest food producer in

the world, is a meager 20 percent as compared to more than 80 percent of the developed nations.

Mr. Omesh Saigal, Secretary, Department of Food Processing who was addressing a press conference here at CII said today that an investment of more than Rs. 1,40,000 crore will be required to increase the level of food processing in the country. An investment of more than \$ 35 billion can be attracted through this." But to meet global standards we will have to remove the technology constraints", said he.

Emphasizing the need of food processing, he said India, which is the second largest food producers in the world, lags far behind when it comes to food processing which is very essential for increasing the shelf life of the produce and providing more benefit to the growers. Annual food production in India is 602 million tonnes—220 million tonnes of cereals, 75 million tonnes of milk and 45 million tonnes of poultry and meat products, but food processing is less than 20 percent.

Regarding the facilities which the government will provide, he said that while MNCs will not be given facilities for the same, the small industries will be taken special care of. The benefits will include developing food parks which will have food testing and other facilities and subsidies (direct capital or interest subsidy) will be provided to the industries with capital

between 4 and 5 crore. The small units will have to be assisted in marketing their products. Technology import and foreign collaborations have already been encouraged by the government.

Regarding the relaxations in taxation, he said the Cabinet will consider a proposal for tax holidays for 10 years for the food processing units. "We will also request the state government to declare tax holidays in sale tax", he said.

Later, CII and Robobank International signed on MoU stating that the premier Dutch bank will assist CII in the conceptualisation and promotion of the next Agro Tech fair which will be held in 2002. Mr. Rajan Nanda, Chairman, CII National Committee on Agriculture and chairman, Agro Tech 2000 and Mr. Hans Megens, Global head - Food & Agri Robobank International signed the document.

The Tribune

02.12.2000



Apeda plans regional cold storage facilities

The Agricultural and Processed Food Products Export Development Authority (Apeda) has identified centres for establishing regional cold storage facilities to facilitate the export of horticulture products.

The 'regional' approach is being adopted as the present practice of setting up such facilities by

entrepreneurs in their respective units has been found unviable, according to the Union Minister of State for Commerce, Mr. Omar Abdulla.

Inaugurating the cold storage facility of the Kerala State Industrial Enterprises (KSIE) at the International airport, the Minister said Apeda's effort was to identify regions throughout the country where horticulture products were available throughout the year.

At the unit-level approach, it was found that the high investments made for establishing the cold storage facility did not result in a regular inflow of revenue. This was primarily because the facility was used only for a short period in a year. The new strategy is aimed at providing the facility collectively for a region with a potential for producing horticulture products throughout or most part of the year. The investment in this case would result in a regular flow of revenue because of economies of scale and utilisation for a longer period of the year, the Minister said.

The proposed centres would serve farms in the respective regions of an area of around 5,000-10,000 hectares. They would have facilities for cold storage, humidity control storage, pre-cooling, washing, sorting, grading and packaging.

The exporters could source the products from the cold storage centres or the centres could directly enter into contracts with the foreign

importers for export of the products, Mr. Abdulla said.

He said the country was the second largest producer of horticulture products in the world. However, the export of agro-products was at present low.

The agro-products sector was riddled with some weaknesses. These included very low productivity level, lack of appropriate pre and post-harvest management practices, lack of infrastructure in terms of good roads, marketing networks and cold storage linkage and lack of quality awareness.

Consequently, the present level of agro exports from the country was less than one per cent of the total world agro trade. Therefore, the country would need to make a concerted effort to overcome the weaknesses, the Minister said.

Business Line 18.12.2000



Policies to lure FDI in food processing urged

The country needs to create a conducive environment in terms of sound taxation policies to attract foreign investment in food processing to the tune of Rs.15,000 crore every year, Omesh Saigal, secretary to the department of food processing industries (DFPI) said today.

Saying that currently only two per cent of fruits and vegetables in

the country was processed, Saigal added that "to bring this level to even 10 per cent, India requires an investment of Rs.1,50,000 crore. This would mean an annual investment of around Rs.15,000 crore which can only come from foreign investors, as I don't see any Indian bank investing in projects involving such huge amounts."

The existing high taxation rates including sales taxes and octroi and the multiplicity of laws and implementing agencies are the two main factors responsible for the present state of the processed food sector, he said at a national seminar on "Food Processing and National Objectives - challenges in the new trade order" organised by the All India Food Processors' Association (AIFPA).

He said for development of this sector, there should be a taxation structure "which is in line with international practices".

Saying that the ministry was proposing to enact a Processed Food Development Act, Saigal said "the nature of the Act will be developmental rather than regulatory. The proposed Act envisages defining standards for uniform and universal application, merit goods for incentives, creation of development fund dedicated to the food processing industries and creation of equalisation fund as cushion for price fluctuations."

The Act also incorporates future trading and new technologies in packaging, processing and

fortification, the secretary added.

Speaking on the occasion, AIFPA president, Gokul Patnaik said "there should be improvements in the labelling and packaging for processed foods to take advantage of retailing along with value addition to attract customers in India and abroad".

Value-addition would also help in improving the perceptions and appearances of Indian food products, he added.

Business Line

8.12.2000



Scale sale: Ready-to-cook fish gets branded

In a first-ever venture of its kind, the Veraval-based bulk fish exporter MRH Trading Company has launched factory-fresh and frozen ready-for-frying pan fish under the brand name 'Fishboy' in Ahmedabad. The company is set to launch the ready-to-cook dressed fish next in Delhi and Mumbai. The Ahmedabad-based MRH Trading Company, headed by Mr. Aashish Bhatt, will be the nationwide distributor of 'Fishboy'. According to the company's chief executive Anil Nair, different varieties of sea fish are on offer, such as Indian mackerel, surma, pomfret, shrimp and lobster, in 500 gm retail packs for home and 5 kg packs for hotels and wholesale.

Mr. Nair told The Financial Express that the catch from the

Arabian Sea on the Saurashtra coast is sent to the factory in Veraval. The factory has a capacity to process 25 tonnes of fish per day and store 500 tonnes.

A small company with big idea, MRH has been in the fish exporting business for the last two years but Mr. Nair has been in the business for the last ten years. MRH sold about 3000 metric tonnes of fishes valued at Rs.4 crore in 1999-2000 and 2,800 tonnes during April-November. Over 90 per cent of the catch is exported to countries like China, Taiwan, South Korea, South East Asia, Middle East and even USA and Canada.

Business Line 20.12.2000



Experts warn against labelling foods

The country must do away with the labelling of foods derived from plant bio-technology methods to avoid confusion among consumers and to stop dissemination of misleading messages on their safety, leading genetic experts attending an International seminar have said.

"There is no scientific justification for labelling foods based on the method by which they are produced and federal regulations should focus on the characteristics of the plant, its intended use and the environment into which it will be introduced, Dr. S. K. Sen of Indian Institute of Technology

Kharagpur, told the 53rd Congress of Indian Chemical Engineers.

Dr. Sen contended that regulations, which selectively capture the products of plant bio-technology, did not reflect the scientific consensus on risk, stifle scientific research and were overly burdensome. "There is no evidence that transferring genes from unrelated organisms to plants posed unique risks. The risks associated with plant varieties developed using bio-technology are the same as those for similar varieties developed using classical breeding".

Business Line 21.12.2000



Developed nations Blocking other's export growth

Washington, Dec. 5: The developed countries adopt unfair and outrageous tactics to keep exports of developing countries down while boosting their own exports to the developing countries and among themselves under one sided international trade rules, the World Bank has pointed out in its annual report on Global Economic Prospects.

The subject has been alluded to in previous reports but, this year, the stark contrast between word and deed and the blatant double standards are highlighted by focusing on the practices of the "quad" countries (the United States, the European Union, Japan and

Canada).

The Bank points out that the quad countries' tariffs for trade among themselves ranges from 4.3 per cent in Japan to 8.3% in Canada but their tariffs to keep out developing country exports are in some cases as high 550 per cent.

"In the quad, only 1.2 per cent of tariff lines are subject to NTB (non-tariff barriers). However, most of the non-tariff barriers are found in agriculture (tariff quotas, for example) and textiles and clothing (multi-fibre arrangement), where developing countries have a comparative advantage," the report says.

Products with high tariffs in quad countries, says the Bank, include major agricultural staple food products, such as meat, sugar, milk, dairy products and chocolate, where tariff rates frequently exceed 100 percent; tobacco and some alcoholic beverages, fruits and vegetables and textiles, clothing and footwear. These are the sectors in which the developing countries, the bank points out, have a competitive and comparative advantage.

In the United States, only 311 of 500 tariff lines are above 15 per cent. Yet 15 per cent of exports from least developed countries to the United States face these tariffs, the Bank notes. There might be considerable potential for the least developed countries to increase their exports if US tariffs were reduced, the Bank says.

Some of the highest tariffs in

industrial countries, says the Bank, are applied to products that are typically exported by developing countries.

For example, almost \$26 billion of exports from developing countries in 1999 to the world were products that would have faced tariffs above 50 per cent in the quad countries.

Only about \$5 million of that sum was actually exported to the quad countries. On the other hand, the quad countries exported about \$50 billion of the same goods, most of it from other industrial countries.

Asian Age

6.12.2000



Ban on import of frozen meat

The Ministry of Supply and Trade of the government of the Republic of Yemen issued a directive banning the import of frozen meat from India as it allegedly contained detrimental microbes. The ban was made effective from August 2, 2000. Most of the Yemeni meat importers were not happy with this decision as a result of which the concerned authorities agreed that those Indian companies which are exporting meat to Jordan would be allowed to export meat to Yemen also. Four Indian companies still remain adversely affected in spite of the above decision.

Assochem Bulletin

Dec. 2000



Want fresh apples? Just click and pluck

Himachal Pradesh would provide information on sale of apples on the internet so that traders from various markets in the country would have correct and advanced knowledge of the varieties available in the state at different points of time during the six month long fruit season.

Giving this information after inaugurating the farmers education training center built at a cost of Rs. 2 crore by the state at Azadpur fruit market here, Himachal chief minister, Prem Kumar Dhumal said apples from the state were in great demand.

"The initial experiment of the Internet sale of fruits has been successful in Kotgarh area, known as apple bowl of the state, and the government plans to extend the facility to Kullu, Kinnaur, Jubbals and Kotkhai areas through some private agencies during the next season," he said. The chief minister said the state government was giving priority to fruit processing and exported 900 tonnes of apple juice concentrate to the US and Germany this year. The Himachal Horticulture Produce Marketing Corporation (HPMC) also sold 4,000 cartons of apple wine to Kerala while the state recorded the production of 4.12 lakh tonnes of fruit this year, he said.

Dhumal said to ensure better prices to the farmers, his government would explore the possibility of direct supply of fruits

of Mumbai, Chennai, Bangalore, Calcutta and some other cities instead of Delhi, which witnesses a glut every year as about 12 lakh tonnes of fruits is supplied here.

According to Mr. Dhumal the production of mango in the state would be doubled from the existing 14,000 tonnes by using about 34,000 hectare land for its cultivation during the decade.

He said production of mango would be encouraged in the low lying areas of Hamirpur, Kangra, Mandi, Una, Sirmour and Solan districts.

Economic Times

23.11.2000



Herbal to the Hilt, this Desi may floor MNCs

Watch out Maybelline, Revlon, Oriflame, Coke, Pepsi! It's not just Vitamin E, moisturized lippers or Coke and Pepsi that sell. These are the times of herbal solutions. India apart, the rage has gripped the world.

So what lies ahead? A sizeable market, and cashing in on it is the Lucknow based National Botanical Research Institute (NBRI). The institute is working overtime on some new herb based products like lipsticks, beer and soft drink.

The effort seems to be paying off. NBRI, in technical collaboration with HLL, is toying with the idea of herbal lipsticks. In fact, the duo is all set for a global launch by the fiscal end.

The director of NBRI, Prof. P Pushpangadan, confirmed this: "Besides changing the entire setup of the state run scientific and research units in the country, development of new products and marketing tie ups with large companies will help institutions like ours to be financial independent."

Similarly, NBRI is on the lookout for a marketing alliance with an Indian liquor house of repute, which would help sell herbal beer brewed in the institute lab in the international market.

"We are negotiating with multinationals to market yet another product," says Mr. Pushpangadan. "A herbal soft drink concocted in house, which is expected to give a tough fight to the two international soft drink giants," he claimed.

Mr. Pushpagadan added that the institute's new initiative has the potential of becoming a major medium of aroma therapy to cure several diseases. In fact it's the growing popularity of aroma therapy in Europe, which has attracted HLL to this project. The 15 different shades of lipsticks are designed to signify four different moods- anti-depressant, meditative, elation and sensuous.

The institute, he said, will soon sign up an agreement with HLL this month. NBRI will hold the patent for the product and will get a one time license fee and a certain share of the sales figure as royalty. Talking about herbal beer,

Mr. Pushpagadan said it would have the ability to cleanse pollutants in the body system, protect the liver and enhance immunity with powerful anti-oxidant. It would taste like beer with an alcohol content of three per cent which can, however, be regulated. The base material of herbal beer would be raw mango.

Since they are available in plenty in Uttar Pradesh, the beer would be readily available at a much cheaper cost. "With its herbal and medicinal qualities, our beer could take on even German Lager beer in international market," he claimed.

"Our soft drink would have 10 medicinal plants as ingredients and the base material would be jaggery. The institution is developing a pilot plant within its premises to demonstrate its production capabilities. Negotiations are on with multinationals to market it as a soft drink next summer," he said.

The institute claims that it is also developing food supplements for children. It is premature to reveal all as the project is at a pharmacological study level and the preparation of scientific data is still in progress, he said.

The Indian share of the \$52 billion global herbal drugs market is at a meagre 5.5 per cent. Compare this with Chinese, Japanese and Russian shares at 60 per cent, 20 per cent and 16 percent respectively.

Economic Times 23.11.2000



Strategy on IPR, patent issue called for

Mysore, Central Food Technological Research Institute director, V. Prakash on Wednesday appealed for a sense of "alertness and urgency" on the intellectual property rights and the patent issue. Delivering the keynote address at the inaugural function of the three day national convention of food scientists and technologists, Dr. Prakash said India had to have a "clear long range strategy" on the issue and move from fighting patents to "fiercely fighting and filing patents". "We cannot be quiet as the Millennium Round of WTO negotiations are coming close," he said. "We need to emphasize, why Alphonso mango does not have a brand equity and why Darjeeling tea does not have a brand equity".

Economic Times 23.11.2000



Punjab set to exploit Fruit Processing Industry

After the agriculture revolution, which made Punjab the most prosperous State in the country with highest per capita income, the State government is now toying with the idea to exploit fruit processing sector with ample potential.

According to sources in Punjab Agro Industries Corporation (PAIC), the State accounts for production of about 2,75,000 million tonnes (MTs) of kinnow

about 1,00,000 MTs of mangoes. Grapes and oranges account for a production of 66,000 MTs each, while litchis are being promoted in a big way in the State.

With rising production of fruits, the State holds sound potential for fruit processing, exports and fruit juice sector. In the adjoining Himachal Pradesh, whose economy is mainly dependent on apple, the fruit processing units have come up in a big way. Sources in PAIC said that the State government has tied up with a Canadian major for setting up a huge project in the fruit juice sector. The proposed project is likely to be set up near Bathinda in Punjab.

According to PAIC, there is potential to generate about Rs. 250 million from fruit juice concentrate alone and additional about Rs. 750 million from processing, preservation and export of fruits. Together the two hold potential to generate at least Rs. 1000 million.

Sources said that this was high time that Punjab diversified into fruit processing, as agriculture production had reached its pinnacle, while MNCs were threatening the dairy industry of the State. The State having highest per capita consumption of milk at about 850 grams has witnessed major fall in prices of dairy products with the price of *desi ghee* (pure ghee) falling from about Rs. 150 per kg. three months back to about Rs. 110/kg as at present. The rate in bulk purchases is down to about Rs. 90 per kg.

Experts opine that once Punjab diversifies to fruit juices, it would give much needed boost to its economy. The proposed Rs. 20 crore project being set up by Canadian MNC in Punjab in fruit juice sector would be a test case for the State government, which would jump whole hog in this sector once this is successful.

Indian Food Industry July-Aug. 2000



Saccharin removed, Alcoholic Beverages added to List of Carcinogens

After an extensive review of evidence of carcinogenicity in experimental animals, saccharin has been removed from the list of substances known or reasonably anticipated to cause cancer in the 9th Edition of the Report on Carcinogens released by the Department of Health and Human Services. Saccharin had been listed in the report as "reasonably anticipated to be a human carcinogen" since 1981. The review that resulted in the delisting determined that the bladder tumours observed in rats arose from a mechanism that is not relevant to humans.

The new edition of the report adds consumption of alcoholic beverages as a "known human carcinogen" for its causal relationship to cancers of the mouth, pharynx, larynx, and esophagus. The risk is most pronounced among smokers and at

the highest levels of consumption. The report also states that there is evidence that suggests a link between alcoholic beverage consumption and cancer of the liver and breast.

Indian Food Industry July-Aug. 2000



Cold chain fraternity meet

Perceiving tremendous investment opportunities in India, the international cold chain fraternity is meeting in Mumbai to explore possibilities for joint ventures and technical tie-ups with Indian partners.

The three-day conference organized by International Association of Refrigerated Warehouses (IARW) is scheduled from December 4-6 and will feature top government officials, leading financial institutions and more than 300 representatives of Indian and international companies.

"Post Harvest losses of fresh fruit and vegetables are enormous in India. The idea is to lay bare the status of India's cold chain infrastructure and highlight the need for new refrigeration technologies to lower the cost of cold storage services," said the director of IARW, Keith Sunderlal. He said that the general perception is that costs of a cold chain is very high and may not be commercially viable in the Indian context.

Economic Times 27.11. 2000



INDUSTRY NEWS

Dairy Farm To Milk Indian Retail Sector

Food retailer, Dairy Farm International Holdings Ltd. has announced a US\$4 million joint venture agreement with India's Spencer & Company Ltd. to open the first ever Cash & Carry stores in India.

The first 50,000 sq. ft store is scheduled to open in Hyderabad in early 2001 and will occupy a 2.5 acre site. The outlet with target smaller retailers, offering them convenience and variety with an extensive range of competitively priced goods under one roof.

Ronalf J. Floto, Dairy Farm's group chief executive, said the timing was right for the group to expand in key markets to continue building sales and profitability. On the latest joint venture with Spencer, he said it "signifies our confidence in the retail industry in the region and in India."

Michael Kok, regional director for Dairy Farm, South Asia, said the partnership "is redefining the food supply chain in India by introducing improved distribution standards and efficiencies." He added that the Cash & Carry concept would introduce and enhance the competitiveness of Indian retailers.

The Cash & Carry deal is Dairy Farm's third with Spencer, which is part of the RPG

conglomerate. Two other joint ventures operate 41 Foodworld supermarkets across southern India and 12 Health & Glow drugstores in Chennai and Bangalore.

Asia Pacific Food Industry July 2000



Welcome turnaround for NERAMAC

Guwahati, Nov. 1-As you enter the headquarters of the North Eastern Regional Agricultural Marketing Corporation Limited (Neramac) here the atmosphere that is likely to greet you is a far cry from the days when the corporation was deep in the red. The air now is full of vibrancy, thanks to the new set of initiative taken by the managers after the corporation restarted on a 'clean slate' with a Rs 10.36 crore revival package of the Board for Industrial and Financial Reconstruction (BIFR) in June last year.

As if to exemplify the new beginning, the Corporation, for the first time in its 18-year-history, was able to hold its annual general meeting (AGM) well ahead of time. 'Earlier we had to take extension of the time limit for holding our AGMs, says managing director Anthony Lianzuala. And there are enough reasons for that too.

In the last financial year (1999-2000), NERAMAC achieved a turnover of Rs.6.48 crore against

the set target of 5.95 crore. The target set for the current financial year is Rs.11.37 crore but the corporation is most likely to surpass that having already achieved a turnover of Rs.11 crore. We expect to finish at Rs.15 to 16 crore', says executive director S Bhattacharjee. Under the BIFR package, the losses expected in the first year (1999-2000) was Rs. 119 lakh but thanks to the good fortune of the corporation it actually amounted to only Rs.64.7 lakh. The corporation is supposed to break even in 2004-05.

The welcome turnaround has been made possible by moves to increase the corporation's business activities. Last year NERAMAC became the first organisation to utilize the Lokpriya Gopinath Bardoloi International Airport to export commodities to Nepal and Indonesia, says Lianzuala. NERAMAC has exported true potato seeds to the two countries. Nepal has also been supplied with pineapple juice. This year, the corporation has initiated border trade at Moreh doing business worth several lakhs. It is also having discussions with the Hindustan Lever Limited (HLL) franchisee at Byrnihat (Meghalaya) to supply pineapple pulp in bulk.

Meanwhile, the initiative to rectify the aseptic packaging line in NERAMAC's pineapple juice concentrate plant at Nalkata (Tripura) had gone ahead and the

plant is ready for a trial run, says the MD. The run, he says, will begin this month with the harvesting of the winter crop. If we succeed now we will go full scale in summer, he adds.

Among the future plans of NERAMAC is the setting up of an integrated plant to process ginger at Byrnihat and the corporation is seeking further extension of the plant to ensure the least wastage of ginger. Another plan is to set up two post-harvest handling centres for vegetables at Sonaribali (Assam) and Thoubal (Manipur). The project, each of the plants costing about Rs.79 lakh, is however, yet to be cleared.

NERAMAC is also contemplating the setting up of a food park near Imphal in Manipur says Lianzuala. The park will be a joint venture between the Government of India, a cooperative society and NERAMAC. NERAMAC will be a technical partner in the venture, he says. The plan is to provide common facilities to food processing industries who set up shop in the park.

The Assam Tribune 02.11.2000



Mother Dairy to expand network

Chennai : The Delhi-based Mother Dairy Fruit and Vegetable Limited is geared to become a national food major. Having established brands like Mother Dairy and Safal, the Rs.800-crore company plans to expand its sales and distribution network and

introduce a variety of new products. A state of the art food processing unit of the company in Mumbai produces high quality, aseptically packed fruit pulps, juices, concentrates and pastes, mostly for export to the U.S., European and Asian countries, say a release.-Corporate Bureau.

Business Standard 07.11.2000



Nutrine plans to acquire fruit brands

NUTRINE Confectionery Company plans to acquire brands in the fruit-based products segment.

"We will be launching such fruit-based products shortly. Discussions are currently on for acquiring brands in the confectionery segment. However, I cannot divulge details", K Siva Mohan Reddy, executive director of Nutrine Confectionery Company said.

He, however, ruled out the possibility of entering the gums segment. Analysts say the company's move is to tap the rural markets because of the potential there. Many other players are also entering the segment via acquisitions and strategic alliances. The total sugar boiled confectionery market in India is estimated to be around 80,000 tonnes in volume terms and Rs.700 crore in terms of value. Nutrine is the leader in the confectionery market with a 25 per cent share.

Business Standard 07.11.2000



Vinayak Vita set to take over Vinsari Fruitech

Vinsari Fruitech Ltd. (VFL), a Tirupati based company engaged in the manufacturing of fruit pulps and concentrates, will be taken over by Vinayak Vita Ltd of the Mumbai-based Motwanis of Roofit Industries.

Vinayak Vita has already entered into an agreement with the promoters of Vinsari Fruitech to purchase 35.76 lakh shares (42 per cent of the subscribed capital) at a price of Rs.4.48 per share. Pursuant to the Securities and Exchange Board of India Substantial Acquisition of Shares Regulations (or the takeover code), Vinayak Vita will be acquiring 17 lakh shares (20 per cent of the subscribed) of VFL from its shareholders at Rs.5 per cent share through an open offer. Vinayak Vita has informed the stock exchanges to this effect. As per its letter, the offer will open on January 2, 2001, and close on January 31.

Vinsari Fruitech had gone for public issue in 1996 to part-finance the fruit processing unit with an annual capacity of 6,340 tonnes. It has been incurring losses since the beginning of commercial production in 1997. For the year ended March 2000 it declared a loss of Rs. 7 lakh on an export turnover of Rs.10.42 crore. Again it incurred a loss of Rs.83 lakh for the half year ended September 2000. Vinayak Vita, on the other hand, has made a net profit of Rs.4 crore on a turnover of Rs.33 crore for the year ended June 2000.

The other listed companies of Motwani enterprises group are Roofit industries and Sun Earth Ceramics Ltd.

Business Standard 10.11.2000



KK Cans in bulk milk cooler market

Khambete Kothari Cans and Allied Products Pvt. (KKCAP) has entered the bulk milk cooler market through a tie-up with FIC s.p.a of Italy.

The company is already marketing bulk coolers in the country under the 'frigomilk' brand. "We are offering a wide range of capacities from 100 litres to 14,000 litres. Our cooler tanks come in vertical open type, horizontal open-type, as well as cylindrical closed tank type designs", Mr. Amit Kothari, Technical Director, KKCAP, said.

The company claims to have already sold around 30 coolers so far and expects to do a business of around 100 units in the current fiscal. "Right now, we are only fabricating the condensers here and importing the entire stainless steel tank from our Italian partner. We will be setting up a separate joint venture company with FIC early next year to manufacture the seamless tanks here" Mr. Kothari Said.

Processed Food Industry Nov..2000



Nestle (I) looking for new brand acquisitions

In an attempt to provide its customers with a wide range of high quality, value-added and safe food products, Nestle India Ltd. is eyeing a series of brand acquisitions in the country's processed food market in next few years.

"We want to expand our portfolio of sub-brands both in product categories we operate in as of today and the new product categories which do not form part of our portfolio in India.

"This will be done either with the introduction of some of our global brands or with the acquisition of a few domestic brands in the Indian processed food market", Nestle India Executive Vice President, Jurg Stocker told the Hindustan Times.

Stocker further pointed out that the company will be setting up manufacturing lines for some of the new products planned for India launch in the near future. These include products like ready to drink flavoured milk, butter, biscuits, new variants of noodles and sauces etc.

Besides this, Nestle India is having serious plans to launch its mass market mineral water 'Pure Life' in the near future, Carlo M. Donati, chairman & managing director, Nestle India, said.

"The new mineral water will be priced competitively in the Indian market as against the price of Rs.90 (approx.) per bottle of 750 ml charged by the company for 'Perrier' and 'San Pallegirino', company's premium segment global mineral water brands which were

launched recently in the Indian market,"Donati said

The Switzerland-based food company sells around 12,000 products in over 100 countries.

In India, Nestle is present in food categories like pure milk, milk products, infant milk formulae, junior foods, weaning cereals, culinary products, instant coffee, tea, health beverages, chocolates, confectionary, wafers and waffles.

Donati added that the company has set out a future plan to remain world class with a continued focus on cost and highly efficient operations, renovation, innovation and people.

"We would like to leverage our global experience in providing new products to the Indian consumers.

Hindustan Times 04.12.2000



Godrej to go low key on foods business

The Godrej group, fresh from turning around Godrej Foods, is planning to shift its focus away from the foods business. As part of the strategy, it may look at putting the two beverage brands, Jumpin and Xs, on the block.

"We have decided to go low key on the foods business and it will no longer be an emphasis area. We may consider selling our brands like Jumpin and Xs if we find the right buyer." Adi B Godrej, chairman of Godrej Foods, told Business Standard today.

Godrej said the group lacked a competitive edge in the foods

business, and even the branded oil business had not been growing for the last couple of years. "There has also been a lot of competition from multinationals," he added.

In the branded oils segment, Godrej Foods has three brands - Godrej Cooklite, Godrej Sunflower Oil and Godrej Shakti- in three price bands. Analysts said it was unlikely that the business would register high growth rates in the coming quarters.

The turnover of Godrej's processed foods division fell by about 20 per cent in 1999-00 owing to stiff competition from multinationals in the soft and aerated drinks markets.

Jumpin and Xs have not been too successful because of the lack of an integrated marketing strategy, say FMCG analysts. The distribution network for the company's foods business was transferred to Godrej Pillsbury, but the arrangement has been discontinued. "We will be doing our own distribution and we do not propose to tie up with any other company," Godrej added. For the time being, Godrej said, the group would continue to be a partner in Godrej Pillsbury.

Frooti is the leader in the Rs.400-crore fruit drink market. According to industry sources, Jumpin's marketshare has fallen from about 35 per cent two years ago to about 24 per cent. Xs, targeted at teenagers, is yet to make its mark.

Business Standard 08.12.2000



Amul says cheese with mozzarella

AMUL cheese, which has experienced the heat of competition in the slice segment from Britannia in the recent times, has decided to focus more on its traditional stronghold cheddar cheese segment. Amul has also decided to promote mozzarella cheese, which is used in pizza and the world famous emmental cheese. Amul enjoys near monopoly in this rapidly growing segment.

According Mr. B M Vyas, MD, Gujarat Cooperative Milk Marketing Federation, owner of Amul brand, "we believe that there is tremendous potential in cheddar cheese segment, which has wide acceptance in the cheese market. Amul has been a leader in this traditionally popular segment of the cheese market.

Size of the cheese market in India has been estimated at 6,000 MT. According to Amul, it has the lion's share of around 64 to 66 percent.

To counter Britannia's onslaught in the cheese segment, Amul's new strategy is to attack the market with the mozzarella and emmental cheese segment where it has almost no competition from any established player.

In mozzarella cheese, which has growing demand from the pizza making companies like Pizza Hut, Domino's Pizza, will give an additional push to the total sale of cheese by Amul during the next two years, according to Mr. Vyas.

Currently, Amul claims to have

around 4,000 million tonne share in the market.

Emmental is another exotic cheese variety, which will soon be made available by Amul in all the corners of the country. Currently, the presence of this variety is limited to important metro cities. Amul plan is to make this product as popular as cheddar cheese.

Economic Times 27.11.2000



Nestle gets FIPB nod to pay royalty to Swiss ally

THE FOREIGN Investment promotion Board (FIPB) has given permission to Nestle India to regularise royalty payment to its technical collaborator Nestec Ltd, Switzerland, effective from February 6, 1999, till date. The Board has also extended the royalty approval expired of February 5, 1999 to February 3, 2000.

The company has been allowed to manufacture sugar confectionery, pickles and chutneys, which are reserved for small-scale industries (SSI), subject to the condition that it will export 50 percent of these goods.

The company stated that the items reserved for SSI are not being manufactured by it and would be sourced from an SSI unit or from units manufacturing SSI items under "carry on business license". The company has mentioned that it has obtained the approval from the Reserve Bank of India (RBI) under the automatic route for technical collaboration in respect of these items.

For items reserved for the SSI sector, no export obligation is required if the items are sourced through SSI units on contract manufacturing basis. The approvals are subject to final clearance from the commerce and industry minister.

On the issue of royalty payment, though the comments of the ministry of food processing industry were not available, the Board noted that under the present liberalised regime, it was entirely tenable to agree to ex-post facto approval for payment of 3.5 per cent and 5 percent royalty for the period February 6, 1999 to February 3, 2000.

Nestle India has the approval from the Reserve Bank of India (RBI) for payment of royalty for a period of 10 years from the date of agreement or seven years from the date of commencement of commercial production.

The technical assistance agreement was filed with the RBI on February 4, 1992.

Business Standard 19.12.2000



Himalaya International

MUMBAI: Himalaya International has received an order for 180 containers of canned mushrooms costing around \$4.5 million from four US-based companies. The company has already obtained the patented technology for processing tenderised mushrooms and work has been going at a new plant.

Business Standard 20.12.2000



Monginis is No.1 cake chain

The Rs.60-crore Monginis India Ltd has emerged as the largest food store franchise chain in India. With 253 franchisees all over the country. Monginis is followed by Baskin Robbins, which has 176 franchisees. This was revealed by a study conducted by Samsika Marketing consultants recently.

Compared to turnover of Rs. 14 crore, one manufacturing unit and 79 cake shops in Mumbai in 1996, the company today boasts of 12 manufacturing units and 253 cake shops all over India, including Calcutta, Pune, Nashik, Goa, Jaipur, Baroda, Hyderabad and Ahmedabad says Zohar H. Khorakiwala, managing director. Monginis Foods Ltd. "Till now, there's not been a single national player in the cake market. We cashed in on the opportunity and managed to establish Monginis as the first branded cake shop in the country. "the company expects a turnover of Rs. 250 crore by the year 2005 and an annual growth rate of 25-30 percent.

More recently. Monginis started test marketing a snack-Khari dips- in the Mumbai market. It is available in a 200gm pack size priced at Rs. 20 plans are afoot to bring out another pack size which is priced under Rs. 10. Interestingly, the company has witnessed a 12 percent increase in its sale since the introduction of Khari Dips.

Born in 1894 Monginis India Ltd. was part of Akbarallys the

chain of departmental stores. Till it branched out in 1976. All along, Monginis cakes and savouries were selling as a local brand at specific Mumbai outlets called treat shops. In 1996, Samsika marketing consultants repositioned it and the Treat shops were renamed Monginis cake shops.

The company claims that in the Rs.80 crore cake market Monginis has an impressive 80 percent share. However, Britannia's packaged cakes enjoy two to three percent of the total cakes market.

With a 100 million cake servings to its credit. Monginis is targeted at the socio economic categories (SEC) A2 and B. Says Kumail H.Khorakiwala, Monginis joint managing director. "Monginis belongs to the indulgence food category and not to staple foods category. Therefore, it is ideal for urban households with a taste for western food".

Business Standard 19.12.2000



Weikfield to venture into value-added mushrooms

Weikfield Agro Products, a joint venture between the city-based Weikfield group and the US based Franklin Mushroom Farms Inc plans to get into value added mushroom exportsm including marinated mushrooms, mushroom salads and mushrooms blended in different curries and sauces and also export fresh mushrooms to earn higher profit margins.

Weikfield's processed mushrooms are sold to large retail food and restaurant chains in the US, including to "California Gold" and "Liberty Gold" through institutional sales.

However, with the aim to increase its profit margins the company is now looking at increasing its retail sales since institutional sales gives it the volumes but not the margins that the company is looking for.

Institutional sales bring in 10 to 12 percent profit margin while retail sales could increase this substantially.

Besides, exporting fresh mushrooms can also improve its sales realisation by 25 percent particularly in the European market where the demand for fresh mushrooms is very high. In the US the demand for canned mushrooms is more as it is mostly consumed by pizza restaurant chains like Pizza Hut and little Caesar Enterprises.

Recently, Little Caesar Enterprises Inc issued Weikfield Agro Products the Corporate Quality Assurance award that would enable the city-based company to export to Caesar Enterprises. One of the largest pizza chain restaurants in the US.

Weikfield has a capacity to produce 10 tonnes of fresh mushrooms per day out of which 10 percent to 15 percent is sold in the domestic market while the balance is processed and exported mainly to the US market.

With the increased overseas demand, the company is looking at expanding its capacity. We plan

to double our existing capacity at a cost of Rs. 10 crore depending on the market demand over the next two years time, Ashwini Malhotra, managing director of Weikfield Agro Products said.

According to Mukesh Malhotra, director of Weikfield, the US imports around two lakh tonnes of processed mushrooms per annum and most of this demand is met by China which has been aggressively pushing exports while India is yet to make a major dent. Interestingly, the US has imposed anti dumping duty of around 140 percent on mushrooms exported from China,

Business Standard 22.12.2000



HLL, Nestle to source Punjab Agro produce

PROCESSED food majors Hindustan Lever and Nestle, along with some defence establishments, have agreed to source dehydrated vegetables for soups and meals from a new plant being set up by Punjab Agro Industries Corporation near Chandigarh.

The plant is one of five new initiatives by the public sector body to increase investment opportunities for processed agro products in the state.

The project for dehydrated vegetables, mainly carrots and onions, is being undertaken by PAIC in collaboration with a private promoter, with Punjab Agro holding not more than 26 per cent stake.

Sources said bank guarantees and funding for the project are already complete and only the

state government's final approvals are necessary. The plant would be set up at Dera Bassi near Chandigarh within the next eight-nine months.

The plant is being viewed with interest by the two leading players in India's soup market because it is entirely steel-based, i.e. there is no danger of contamination and spoiling of vegetables due to rust or corrosion, they added. Defence establishments have also evinced interest because dehydrated vegetables form a crucial part of every soldier's diet in high altitude regions. PAIC has also entered into a collaboration with the US major, Instapro for producing extruded breakfast cereals to be sold and marketed in the domestic market.

While Instapro would be supplying the technology and pick up some stake, an Indian partner would be roped into manufacture and run the company.

Wood particle boards from paddy straw are another area of interest in the state, for which PAIC already has some Canadian companies lined up for a buy-back arrangement. Details of the project are ready. We are now scouting for an Indian promoter to put in the requisite funds, source, said.

Economic Times 12.12.2000



ITC to export processed fruit

Itc is now going to get into exports of processed fruit products like mango pulp. This was indicated here by Mr Sisir Kumar, CEO of ITC international business division

(IBD) The division currently accounts for around Rs.500 crore of ITC's annual turnover.

The target is to treble it to Rs. 1,500 crore by the year 2004-2005, Mr. Kumar said.

The processed fruits are to be exported to supermarkets in the US and Europe. ITC would, he said not invest in setting up processing plants but utilize the existing infrastructure whose capacity was under-utilized.

ITC's IBD also has a plan to boost exports of the other commodities it is trading in.

ITC generates around Rs. 50 crore from the 8,000 tonnes of coffee it exports every year. The IBD now plans to increase coffee-export volumes to 20,000 tonnes by the year 2004-2005.

A significant boost is also planned for Soya where ITC-IBD is currently doing around Rs.150 crore of exports every year. There is also a thrust on aquaculture where ITC does shrimp exports to the tune of Rs.100 crore a year.

Economic Times 12.12.2000



Move over Mc Donald's, Domino's, here comes apna Mother Dairy

It is planning to set up 15 fast food outlets in Delhi; identified 20 cities across India for marketing value added products; set up a Rs 100 crore fresh fruits and veggies market in Bangalore; operate on a no-profit basis; and is targeting a turnover of Rs.5,000-crore by 2005. All this without using any celebrity in its new ad campaign

Food industry biggies, watch

out. The Rs.1,000-crore cooperative sector Mother Dairy Fruit and Vegetable Ltd. is on a roll, with a fast-track growth plan for every area of its business its flagship brand Safal is expanding to soon include bread, pulses and spices in its existing range of frozen vegetables, peas, jams, squashes, ketchup, pickles, *dahi*, flavored milk and fruit-based drinks. Volumes of its newly launched Dahi alone are expected to touch 2,500 tonnes annually.

Says managing director, NA Shaikh: Our objective is to have a Safal/Mother Dairy product in every Indian household and we will have the entire range of food products within three years.

Ambitious? Yes. Unrealistic? No. Set up as a new company this April after the merger of NDDDB's fruit and vegetable project with Mother Dairy, the NDDDB subsidiary has been given complete commercial independence. Consequently, the company has decided to strengthen its backward and forward linkages, improve distribution networks, enter new markets, and expand its product range. As a first step, the company is focusing all its energies on markets in and around Delhi and Mumbai. New distributors and franchisees are being roped in to ensure that Safal products are available in every Mumbai neighbourhood by April next. Attempts are also on to get more franchisees for manufacturing Safal products without compromising on quality. In Delhi, where Safal products are sold through Mother Dairy milk booths, the company is adding 50 outlets a year, besides expanding into suburbs like Faridabad, Ghaziabad, Gurgaon and Noida. Though there are no

plans yet to expand Mother Dairy icecreams from Delhi to other northern cities because of sister company Amul's extensive presence, the brand already has 45 percent of the capital's market. Ice cream prices have remained reasonable across the board in Delhi over the last three years due to our presence. It remains our most profitable venture, "Mr shaikh said.

Yet the company is realistic enough to recognise that its ice cream parlors are not viable per se. Hence the foray into fast food from the same space. We already have one fast food outlet in Pragati Maidan.

The same kind of restaurants would be set up all over the city, serving popular Indian snacks. They will be branded Family's delight, in keeping with our focus on the entire family," he added.

To improve procurement and strengthen linkages with farmers in South India, Mother Dairy is setting up a a Rs.100-crore integrated vegetable market in Bangalore, to operate as a mandi for wholesalers and retailers.

The state amended its agricultural marketing board laws to allow our presence because they realize that the new mandi will make transactions more transparent for growers and consumers. We will be bringing agri produce to the mandi from surrounding areas and initially expect volumes to reach 900 tonnes per day. Constructions will begin next month, Mr Shaikh said.

Economic Times 13.12.2000



GOVT. CIRCULARS

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi the 13th September, 2000

G.S.R. 718 (E). - Whereas certain draft rules, further to amend to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954). In the notification of Government of India the Ministry of Health and Family Welfare (Department of Health). Number G.S.R. 429 (E). dated the 11th June. 1999 in the Gazette of India, Extraordinary Part II. Section 3, Sub-section (i), Dated the 11th June. 1999 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of a period of forty five days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public.

And whereas the copies of the said Gazette of India were made available to the public on 14th June, 1999. And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government.

Now, therefore, in exercises of the powers conferred by sub-section (1) of section 23 of the said Act. The Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1995, namely:-

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (4th Amendment) Rules, 2000
- (2) They shall come into force on the date of their publication in the Official Gazette except rule 2 (c) which shall come into force after six months from the date of their publication.
2. In the Prevention of Food Adulteration Rules, 1955.-
 - (a) in rule 29-
 - (i) clause (g) shall be omitted:
 - (ii) the following clauses shall be inserted at the end namely:- (h) Flavour emulsion and flavour paste for use in carbonated or non-carbonated beverages only under label declaration as provided in clause (13) of sub-rule (ZZZ) of rule 42";

- (b) in rule 42, of the sub-rule (ZZZ) (12), the following shall be inserted namely :- "(ZZZ) (13) Every container or package of flavour emulsion and haviour paste meant for use in carbonated or non-carbonated beverages shall carry the following declaration in addition to the instructions for dilution, namely:-

"FLAVOUR EMULSION AND FLAVOUR PASTE FOR USE IN CARBONATED OR NON-CARNONATD BEVERATGES ONLY."

- (c) In rule 57, in sub-rule (2) in the Table -

- (i) against serial No. 2 in column 2, after item (ii-a) the following items and entries shall be inserted, namely:-

(2)	(3)
(ii-b) Juice of orange, grape, apple, tomato, pineapple and lemon	5.0
pulp and pulp products of any fruit.	5.0
(ii-c) Infant milk substitute and Infant foods	15.0
(But notless than 2.8)"	

- (ii) Against serial No. 3 in column 2, after item (ii-b) and the entries clating there to, following shall be inserted, namely:-

(2)	(3)
(ii-c) Juice of orange grape, apple, tomato, pineapple and lemon	0.2
pulp and pulp products of any fruit.	0.2

- (iii) against serial No. 4 in column 2 after items (i) and the entries relating thereto, following shall be inserted, namely :-

(2)	(3)
"(i-a) Jam, Jellies and marmalade	250
Juice of orange, apple, tomato, pineapple and lemon	250
Pulp and pulp products of any fruit	250"

- (iv) Against serial No.5 in column 2, for items (i) and entries relating thereto, the following shall be substituted, namely:-

(2)	(3)
(i) Ready to drink baverages	5.0
Juice of orange, grape, tomato, pipeapple and lemon	5.0
Pulp and pulp products of any fruit	5.0
(i-a) Infant milk substitute and Infant foods	50.0
(but not less than 25.0)"	

Foot Note :- The Prevention of Food Adulteration Rules, 1955 were published in Part II. Section 3, of Gazette of India vide S.R.O. 2105 dated 12-9-1995 and were last amended vide G.S.R. No. 537 (E) dated 16.6.2000.

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi the 13th September, 2000

G.S.R. 716 (E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules 1955 were published as required by sub-section (1) of Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954). With the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), number G.S.R. 418 (E), dated the 10th May, 2000 in the Gazette of India, Extraordinary Part II, Section 3 sub section (I) dated the 10th May, 2000 inviting objections and suggestions from the persons likely to be afflicted thereby before the expiry of forty-five days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public.

And whereas the copies of the said Gazette of India were made available to the public on 11th May, 2000;

And whereas the objectives and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the power conferred by section 23 of the Prevention of Food Adulteration Act 1954 (37 of 1954), the Central Government, after consultation with the central committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely :-

RULES

1 (1) These rules may be called the Prevention of Food Adulteration (5th Amendment) Rules, 2000.

(2) They shall come into force on and from the 30th day of September, 2000.

2. In the Prevention of Food Adulteration Rules, 1955

(i) in rule 42 -

(a) for sub-rule (V) the following sub-rule shall be substituted, namely :- "(V) Every container or package of edible common salt or iodised salt or iron fortified common salt containing permitted anti-caking agents shall bear the following label, namely:-

EDIBLE COMMON SALT OF IODISED SALT OR IRON FORTIFIED
COMMON SALT*

CONTAINS PERMITTED ANTI-CAKING AGENT

*Strike out whichever is not applicable

(b) in sub rule (ZZZ) clause (11) shall be omitted;

(ii) rule 44H shall be omitted:

(iii) in rule 49 in sub rule (10) for the words, "Table iodised salt or table iron fortified common salt". the words "Edible common salt or iodised salt or iron fortified common salt" shall be substituted.

[E No.P-15014/2/200-PH(Food)

DEEPAK GUPTA

Jt. Secy.

Foot Note : The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide S.R.O.2105 dated 12-9-1955 and were last amended vide No. G.S.R.537(E) dated 13-6-2000.

HEALTH & FAMILY WELFARE

PRESS INFORMATION BUREAU, GOVERNMENT OF INDIA

PRESS NOTE

Government have issued notification GSR No. 718 (E) dated 13.9.2000 amending the provision in PFA Rules 1955 pertaining to use of permitted colours in certain food product. It also seeks to lay down limits for metals in various fruit products, tomato juice and infant milk substitutes and infant foods.

As present only eight synthetic food colours are allowed to be used in certain food products, either singly or in combination where a necessity for such use has been established. Rule 29 of the PFA Rules indicated those food products in which such colouring can be used. It is now proposed to allow use of permitted colours in flavour emulsions and flavour pastes used in carbonated or non carbonated beverages subject to suitable label indication. This will allow colour and flavoured paste/flavoured emulsion to be used together, rather than add them separately.

The notification also lays down the limits for copper, arsenic, tin and zinc in various food products. Currently limits for individual products have been laid down only for some fruit or vegetable products e.g. limit for zinc in all products covered under the FPO 1955 or that of copper for tomato based products are currently covered under the general category of "foods not specified". Similarly, in the case of infant milk substitute and infant food also, such limits were available only for tin and arsenic.

Now Govt. proposes to harmonise these limits for metals, arsenic etc. in the case of fruit products and tomato base products with Codex standards for such products keeping in view the state of the domestic industry and also the concerns of food safety. In the case of infant food and infant milk substitutes, limits are being fixed for copper and zinc for the first time.

Although metals consumed in excess of certain limits can be harmful to health, they also occur naturally in many food products and also act as trace elements which contribute to the healthy development of babies, when consumed in appropriate quantities. Therefore, limits have been fixed for trace elements like copper and zinc in baby foods, keeping in mind consumer interest in this regard.

Earlier, the draft notification in this regard was published vide GSR No. 429 (E) dated 11.6.99 calling for public comments. The final notification has been issued after taking into consideration the view and objections received from the public on the draft notification.

Ministry of Health & Family Welfare (Department of Health)

New Delhi, Asvina 07, 1922/ September 29, 2000

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PRESS INFORMATION BUREAU, GOVERNMENT OF INDIA

GROUP TO RECOMMEND SIMPLIFICATION OF INDUSTRIAL LAW

New Delhi, Bhadrapada 31, 1922

22th September 2000

The Government of India is constituting a Group under the Chairmanship of the Cabinet Secretary to make recommendations regarding Central and state Industrial Laws to make them more useful and simple. The Group will also recommend substitution of routine inspections by self-certification.

Inaugurating the EXPO 2000 and the new Exhibition Centre of Okhla, today the minister of State for Small Scale Industries & Agro and Rural Industries Smt. Vasundhara Raje said that a Marketing Development Assistance (MDA) scheme is also being formulated for providing much needed marketing assistance to the small scale and tiny industrial unit. The MDA is likely to be launched from 1st April 2001 as a plan scheme, she said. Smt. Raje also agreed to consider the purchase preference scheme for giving priority to SSI products for purchase by the Government Departments and Undertakings.

The SSI Minister said that the road map for the development of SSI and Tiny Sectors has already been chalked out with the announcement of special package by the Prime Minister at the National Conference on SSI on September, 30. She hoped that small irritants in the implementation of some items in the package will be ironed out soon and it would provide impetus to SSI Units to take initiative, inculcate quality consciousness and grab the opportunities thrown up by the globalization along with the challenges of competition.

The Minister said that the National Small Industries Corporation (NSIC) of SSI Minister has a great role to play. NSIC's Single Point Registration Scheme is very helpful to small units to get supply orders from Government Departments and PSUs. The NSIC, however, needs to give renewed thrust to the consortia approach for marketing of the products of the small units, Smt. Raje said.

The Secretary, SSI, A & RI, Shri D.P. Bagchi in his address advised the NSIC to organize more Buyer-Seller meets on the product-specific basis and fulfil its role to promote Brand Marketing. Shri Bagchi said that technology transfer activities of NSIC must be strengthened. He agreed to the suggestion of FASII President, Shri V. S. Narasimhan to extend the Credit Guarantee Scheme to the NSIC.

The NSIC, chairman and Managing Director, Shri M. Ahmed said the NSIC has provided training to more than 40,000 persons and is providing common facilities to about 500 to 600 units every year. Over 50,000 small units are assisted through various schemes including dissemination of information and international cooperation.

Shri Narasimhan demanded that 15 percent purchase from SSI Units may be made mandatory for all Government Departments. He congratulated the Government for announcing the package of incentives for small and tiny sector, which he said, would promote the sector and also generate large-scale employment.

The EXPO - 2000, organized by the NSIC is being participated by over 100 units who have displayed their latest products. A Buyer-Seller Meet was also organized on the occasion in which representatives from Defence, NTPC, DGS&D, Telecom Department, Ministry of Home Affairs, UNIDO, Industrial Association and Entrepreneurs, participated.

PRESS INFORMATION BUREAU, GOVERNMENT OF INDIA

PRESS NOTE

Government have issued two notifications amending the provisions of the PFA Rules to amend the existing standards for mineral water and introducing the standards for packaged drinking water.

GSR No. 759 issued on 29.9.2000 has amended the existing standards for natural mineral water whereby only water obtained directly from natural or drilled underground sources complying with specified standards

and packaged close to the point of emergence of the source with specific hygienic precautions and is not subjected to nay treatment can be termed as natural mineral water. It is also required to be sold only under mandatory BIS certification. The standards have been aligned with international standards for this product.

The GSR No. 760 (E) lays down the specifications for packaged drinking water. This water can be obtained from any source and it can be treated and disinfected to achieve the specifications laid down for this product. The treatment allowed include a range of processes such as reverse osmosis, remineralisation, filtration, aeration, decantation etc, the standards for the packaging / bottles to be used for this product have also been specified. These products can also be sold only under mandatory BIS certification.

Both the notifications will come into effect on 29.3.2001, giving the industry 6 months time to gear themselves to obtain the BIS certification.

Ministry of health and family welfare, (Deptt. of Health)
New Delhi, Saka 26, 1922 / October 18, 2000

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MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi the 29th September, 2000

G.S.R. 760 (E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) number G.S.R. 85 (E) dated the 3rd February, 2000 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (I) dated the 3rd February, 2000 inviting objection and suggestions from the persons likely to be affected thereby before the expiry of sixty days form the date on which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said Gazette of India were made available to the public on 4th February, 2000;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

RULES

- 1 (1) These rules may be called Prevention of Food Adulteration, (76 Amendment) Rules, 2000.
- (2) They shall come into force on 29.3.2001

2. In the Prevention of Food Adulteration Rules, 1955,

(iv) in rule 42, in sub-rule (zzz), after clause (13), the following clause shall be inserted, namely:-

"(14) Every package of drinking water shall carry the following declaration in capital letters having the size of each letter as prescribed in rule 36.

PACKAGED DRINKING WATER

(ii) in rule 49, after sub-rule (27), the following sub rule shall be inserted, namely :-

"(28) No person shall manufacture, sell or exhibit for sale packaged drinking water except under the Bureau of Indian Standards Certification Mark".

(iii) In Appendix 'B' after item A.32, the following item shall be inserted, namely:-

A.33 Packaged drinking water (other than Mineral Water):-

"Packaged drinking water" means water derived from any source of potable water which is subjected to treatment, namely, decantation, filtration, combination of filtration, aerations, filtration with membrane filter, depth filter, cartridge filter, activated carbon filtration, demineralisation, remineralisation, reverse osmosis and packed. It may be disinfected to a level that will not lead to harmful contamination in the drinking water. It may be disinfected by means of chemical agents and / or physical method of the number of micro-organism to a level that does not compromise food safety or suitability.

It shall be packed in clean, sterile, colourless, transparent and tamperproof, bottle/containers made of polyethylene (PE) conforming to IS: 10146 or polyvinyl chloride (PVC) conforming to IS: 10151 or polyalkylene terephthalate (PET and PBT) conforming to IS: 12252 or polypropylene conforming to IS: 10910 or foodgrade polycarbonate or sterile glass bottles suitable for preventing possible adulteration or contamination of the water.

All packaging materials of plastic origin shall pass the overall migration and colour migration limits as laid down in the relevant Indian Standards for products for respective packaging materials.

It shall conform to the following standards namely:-

Sl. No.	Characteristics	Requirements
(1)	(2)	(3)
(1)	Colour	Not more than 2 Hazen Units/ True Colour Units
(2)	Odour	Agreeable
(3)	Taste	Agreeable
(4)	Turbidity	Not more than 2 nephelometric turbidity unit (NTU)
(5)	Total Dissolved Solids	Not more than 500 mg/litre
(6)	pH	6.5-8.5
(7)	Nitrates (as NO ₃) and Nitrites (as NO ₂)	Not more than 45 mg/litre and Not more than 0.02 mg/litre respectively

(8)	Sulphide (as H_2S)	Not more than 0.05 mg/litre
(9)	Mineral Oil	Not more than 0.01 mg/litre
(10)	Phenolic Compunds (as C_6H_5OH)	Not more than 0.001 mg/litre
(11)	Manganese (as Mn)	Not more than 0.01 mg/litre
(12)	Copper (as Cu)	Not more than 0.05 mg/litre
(13)	Zinc (as Zn)	Not more than 5 mg/litre
(14)	Fluoride (as F)	Not more than 1.0 mg/litre
(15)	Barium (as Ba)	Not more than 1.0 mg/litre
(16)	Antimony (as Sb)	Not more than 0.005 mg/litre
(17)	Nickel (as Ni)	Not more than 0.02 mg/litre
(18)	Borate (as B)	Not more than 5 mg/litre
(19)	Anionic Surface Active Agents (as MBAS)	Not more than 0.2 mg/litre
(20)	Silver (as Ag)	Not more than 0.01 mg/litre
(21)	Chlorides (as Cl)	Not more than 200 mg/litre
(22)	Sulphate (as SO_4)	Not more than 200 mg/litre
(23)	Magnesium (as Mg)	Not more than 30 mg/litre
(24)	Calcium (as Ca)	Not more than 75 mg/litre
(25)	Sodium (as Na)	Not more than 200 mg/litre
(26)	Alkalinity (as HCO_3)	Not more than 200 mg/litre
(27)	Arsenic (as As)	Not more than 0.05 mg/litre
(28)	Cadmium (as Cd)	Not more than 0.01 mg/litre
(29)	Cyanide (as CN)	Not more than 0.05 mg/litre
(30)	Chromium (as Cr)	Not more than 0.05 mg/litre
(31)	Mercury (as Hg)	Not more than 0.001 mg/litre
(32)	Lead (as Pb)	Not more than 0.01 mg/litre
(33)	Selenium (as Se)	Not more than 0.01 mg/litre
(34)	Iron (as Fe)	Not more than 0.1 mg/litre
(35)	Poly nuclear aromatic hydrocarbons	Not detected
(36)	Polychlorinated biphenyle (PCB)	Not detected

(37)	Aluminium (as Al)	Not more than 0.03 mg/litre
(38)	Residual free chlorine	Not more than 0.2 mg/litre
(39)	Pesticide Residues	Below detectable limits
(40)	"Alpha" activity	Not more than 0.03 mg/litre (Bq)
(41)	"Beta" activity	Not more than 1 pico curie/litre (pCi)
(42)	Yeast and mould counts, 1 x 250 ml.	Absent
(43)	<i>Salmonella</i> and <i>Shigella</i> , 1x 250 ml	Absent
(44)	<i>E.Coli</i> or thermotolerant bacteria, 1 x 250 ml	Absent
(45)	<i>Coliform</i> bacteria, 1 x 250 ml	Absent
(46)	Faecal <i>streptococci</i> and <i>Staphylococcus aureus</i> , 1 x 250 ml	Absent
(47)	<i>Pseudomonas aeruginosa</i> 1 x 250 ml	Absent
(48)	Sulphite-reducing anaerobes, 1 x 50 ml	Absent
(49)	<i>Vibrio cholera</i> and <i>V. paraheemolyticus</i> , 1 x 250 ml	Absent
(50)	Aerobic Microbial Count	The total viable colony count shall not exceed 100 per ml at 20°C to 22°C in 72 h on agar-agar or on agar-gelatin mixture, and 20 per ml at 37°C in 24 h on agar-agar.

Labelling Prohibitions

No claims concerning medicinal (preventative, alleviative or curative) effects shall be made in respect of the properties of the products covered by the standard. Claims of other beneficial effects related to the health of the consumer shall not be made.

The name of the locality, hamlet or specified place may not form part of the trade name unless it refers to a packaged water collected at the place designated by that trade name.

The use of any statement or of any pictorial device which may create confusion in the mind of the public or in any way mislead the public about the nature, origin, composition, and properties of such waters put on sale is prohibited.

[No.P-15014/6/97-P.H.(Food)]

DEEPAK GUPTA, Jt.Secy

Foot note : The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of the Gazette of India vide SRO 2105 dated the 12-9-1955 and were last amended vide G.S.R. 716 (E) dated 13-9-2000.

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 29th September, 2000

G.S.R. 759 (E). - WHEREAS certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the ministry of Health and Family welfare (Department of Health) number G.S.R. 808 (E), dated the 10th December, 1999 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) dated the 10th December, 1999 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of sixty days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public.

AND WHEREAS the copies of the said Gazette of India were made available to the public on 13th December, 1999.

AND WHEREAS the objections and suggestions received from the public on the said draft rules have been considered by the Central Government.

NOW THEREFORE, in exercise of the powers conferred by section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely :-

RULES

1. (1) These may be called the Prevention of Food Adulteration

(6th Amendment) Rules. 2000.

(2) They shall come into force on 29-3-2001.

2. In the Prevention of Food Adulteration Rules, 1955-

(i) in rule 42, in sub-rule (ZZZ) after clause (14), the following clause shall be inserted, namely:-
"(15) Every package of mineral water shall carry the following declaration in capital letters having the size of each letter as prescribed in rule 36:

NATURAL MINERAL WATER

(ii) in rule 49, after sub-rule (28), the following sub rule and explanation shall be inserted, namely:-
"(29) No person shall manufacture, sell or exhibit for sale mineral water except under the Bureau of Indian Standards Certification Mark".

Explanation - For the purpose of this rule, the expression "mineral water" shall have the same meaning as assigned to it in item A.32 of Appendix 'B' to these Rules.

(iii) In Appendix 'B', for item A.32, the following item shall be substituted namely:-

"A.32 1. Mineral water means includes all kinds of Mineral Water or Natural mineral water by whatever name it is called and sold.

2. Description and Types of Mineral Water.

- (i) Natural mineral water is water clearly distinguished from ordinary drinking water because -
 - (a) It is characterized by its content of certain mineral salts and their relative proportions and the presence of trace elements or of the other constituents;
 - (b) It is obtained directly from natural or drilled sources from underground water bearing strata and not from Public water supply for which all possible precautions should be taken within the protected perimeter to avoid any pollution of, or external influence on, the chemical and physical qualities of natural mineral water.
 - (c) Of the constancy of its composition and the stability of its discharge and its temperature, due account being taken of the cycles of minor natural fluctuation.
 - (d) It is collected under conditions which guarantee the original microbiological purity and chemical composition of essential components.
 - (e) it is packaged close to the point of emergence of the source with particular hygienic precautions;
 - (f) it is not subjected to any treatment other than those permitted by this standard;
- (ii) Naturally Carbonated Natural Mineral Water - A Naturally carbonated natural mineral water is a natural mineral water which, after possible treatment as given hereunder and re-incorporation of gas from the same source and after packaging, taking into consideration usual technical tolerance, has the same content of carbondioxide spontaneously and visibly given off under normal conditions of temperature and pressure.
- (iii) Non-Carbonated Natural Mineral Water - A non-carbonated natural mineral water is a natural mineral water which, by nature and after possible treatment as given hereunder and after packaging taking into consideration usual technical tolerance, does not contain free carbon dioxide in excess of the amount necessary to keep the hydrogen carbonate salts present in the water dissolved.
- (iv) Decarbonted Natural Mineral Water- A decarbonted natural mineral is a natural mineral water which after possible treatment as given hereunder and after packaging, has less carbon dioxide content than that at emergence and does not visibly and spontaneously given off carbon dioxide under normal conditions of temperature and pressure.
- (v) Natural Mineral Water Fortified with Carbon Dioxide from the Source- A natural mineral water fortified with carbon dioxide from the source is a natural mineral water which, after possible treatment as given hereunder and after packaging, has more carbon dioxide content than that at emergence.
- (vi) Carbonated Natural Mineral Water - A carbonated natural mineral water is a natural mineral water which, after possible treatment as given hereunder and after packaging, has been made effervescent by the addition of carbon dioxide from another origin.

3. Treatment and handlings:- Treatment permitted include separation from unstable constituents, such as compounds containing iron, manganese, sulphur or arsenic, by decantation and/or filtration, if necessary, accelerated by previous aeration.

The treatments provided may only be carried out on condition that the mineral content of the water is not modified in its essential constituents, which give the water its properties.

The transport of natural mineral waters in bulk containers for packaging or for any other process before packaging is prohibited. Natural Mineral water shall be packaged in clean and sterile containers.

The source or the points of emergence shall be protected against risks of pollution.

The installation intended for the production of natural mineral water shall be such as to exclude any possibility of contamination. For this purpose, and in particular -

- (a) The installation for collection, the pipes and the reservoir shall be made from materials suited to the water and in such a way as to prevent the introduction of foreign substances into the water;
- (b) The equipment and its use for production, especially installations for washing and packaging, shall meet hygienic requirements.
- (c) If, during production it is found that the water is polluted, the producer shall stop all operations until the cause of pollution is eliminated;

4. All Mineral Water shall conform to the following standards, namely.

Sl. No.	Characteristics	Requirements
1	2	3
1.	Colour, Hazen Unit/ True Colour Unit	Not more than 2
2.	Odour	Agreeable
3.	Taste	Agreeable
4.	Turbidity	Not more than 2 nephelometric turbidity unit (NTU)
5.	Total Dissolved Solids	150-700 mg/litre
6.	pH	6.5-8.5
7.	Nitrates (as NO ₃)	Not more than 50 mg/litre
8.	Nitrites (as NO ₂)	Not more than 0.02 mg/litre
9.	Sulphide (as H ₂ S)	Not more than 0.05 mg/litre
10.	Mineral Oil	Not detectable
11.	Phenolic Compounds (as C ₆ H ₅ OH)	Not detectable
12.	Manganese (as Mn)	Not more than 0.2 mg/litre
13.	Copper (as Cu)	Not more than 1 mg/litre

14.	Zinc (as Zn)	Not more than 5 mg/litre
15.	Fluoride (as F)	Not more than 1 mg/litre
16.	Barium (as Ba)	Not more than 1.0 mg/litre
17.	Antimony (as Sb)	Not more than 0.005 mg/litre
18.	Nickel (as Ni)	Not more than 0.02 mg/litre
19.	Borate (as B)	Not more than 5 mg/litre
20.	Surface active agents	Not detectable
21.	Silver (as Ag)	Not more than 0.01 mg/litre
22.	Chlorides (as Cl)	Not more than 200 mg/litre
23.	Sulphate (as SO_4)	Not more than 200 mg/litre
24.	Magnesium (as Mg)	Not more than 50 mg/litre
25.	Calcium (as Ca)	Not more than 100 mg/litre
26.	Sodium (as Na)	Not more than 150 mg/litre
27.	Alkalinity (as HCO_3)	75-400 mg/litre
28.	Arsenic (as As)	Not more than 0.05 mg/litre
29.	Cadmium (as Cd)	Not more than 0.003 mg/litre
30.	Cyanide (as CN)	Not more than 0.07 mg/litre
31.	Chromium (as Cr)	Not more than 0.05 mg/litre
32.	Mercury (as Hg)	Not more than 0.001 mg/litre
33.	Lead (as Pb)	Not more than 0.01 mg/litre
34.	Selenium (as Se)	Not more than 0.05 mg/litre
35.	Poly nuclear aromatic hydrocarbons	Not detectable
36.	Polychlorinated biphenyle (PCB)	Not detectable
37.	Pesticide Residue	Below detectable limits
38.	"Alpha" activity	Not more than 0.1 Bacquer I/litre (Bq)
39.	"Beta" activity	Not more than 1 pico curie/litre (pCi)
40.	Yeast and mould counts	Absent
41.	<i>Salmonella</i> and <i>Shigella</i>	Absent
42.	<i>E-Coli</i> or thermotolerant Coliforms, 1 x 250 ml	Absent

43.	Total coliform bacteria, A x 250 ml	Absent
44.	Fecal <i>streptococci</i> and <i>Staphylococcus aureus</i> 1 x 250 ml	Absent
45.	<i>Pseudomonas aeruginosa</i> , 1 x 250 ml	Absent
46.	Sulphite reducing anaerobes, 1 x 50 ml	Absent
47.	<i>Vibrio cholera</i> , 1 x 250 ml	Absent
48.	<i>V. Paraheamolyticus</i> , 1 x 250 ml	Absent

5. Labelling Prohibitions No claims concerning medicinal (preventative, alleviative or curative) effects shall be made in respect of the properties of the product covered by the standard. Claims of other beneficial effects related to the health of the health of the consumer shall not be made.

The name of the locality, hamlet or specified place may not form part of the trade name unless it refers to a natural minerals water collected at the place designated by that trade name.

The use of any statement or of any pictorial device which may create confusion in the mind of the public or in any way mislead the public about the nature, origin, composition and properties of natural mineral waters put on sale is prohibited.

[No.P-15014/11/99-PH(Food)]

DEEPAK GUPTA, Jt. Secy.

Note : The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide SRO 2105 dated 12-9-1955 and were last amended vide GSR No. 716 (E) dated 13-9-2000.

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GOVERNMENT OF INDIA
OFFICE OF THE COMMISSIONER OF CUSTOMS
15/1, STRAND ROAD, M.S. BUILDING
WEST BENGAL : CALCUTTA.

C.No. VIII (48) 29/ Cus/Prev/WB/99/Pt-1

Dated : 16/10/2000

PUBLIC NOTICE :- 7/CUS/2000

This is to bring to the notice of all concerned that excepting imports of same specified items, export from India to Nepal of any single consignment of value exceeding Nepalese Rs. 16000/- (approximately) equivalent to Indian Rs. 10,000/- have been subjected to banking system and necessary formalities are to be observed by the Indian exporters, intending to export goods to Nepal under the new system.

(D. K. DATTA)
COMMISSIONER OF CUSTOMS
WEST BENGAL : CALCUTTA

SMALL SCALE INDUSTRY

Subject : Reduction in the investment limit on SSI/Ancillary Undertakings- Clarification reg.

References have been received from different quarters seeking clarification relating to the expansion of such units, which were provisionally/permanently, registered prior to issue of notification No. S.O. 1288 (E) dated 24th December, 2000 reducing thereby the investment limit from Rupees 300.00 Lakhs to Rupees 100.00 Lakh.

Clarification in respect of status of such existing units and the units registered provisionally have already been issued vide this office letters of even number dated 14th and 27th March 2000 respectively. The further clarification to the above query is as under:

"Any unit which has received provisional/permanent registration prior to 24th December, 1999 and has taken concrete steps for implementing the project would continue to enjoy the SSI status so long as investment in plant & machinery does not exceed Rs. 300.00 lakhs.

No time limit is prescribed for such units to reach the ceiling of Rs. 300.00 lakhs.

The clarification may please be brought to the notice of all concerned for taking further necessary action accordingly.

(Dr. C.S. Prasad)

Additional Development Commissioner (SSI)

SETTING UP OF SSI UNITS BASED ON BIO-TECHNOLOGY APPLICATIONS

Applications of bio-technology in the field of production of agro based raw material resources is now going to play a very important role in setting up of food processing industries in the country. Bio-technology application are no longer limited to living entities but include a wide range materials and techniques which have gained vital importance in industrial applications. It has been accepted the world over as the umbrella of technologies consisting of microbial technology. In short, bio-technology finds application in a variety of fields ranging from agriculture to modern medicine.

Department of bio-technology, Ministry of Science and Technology, Government of India is encouraging the setting up of projects based on bio-technology. According, the following has been nominated as the nodal officer to handle all the queries from SSI entrepreneurs related to bio-technology and spirulina:

Dr. K.K. Tripathi, Director

Department of Science & Technology, CGO Complex, 7th Floor, Block 2

Lodi Road, New Delhi - 110003

Phone : 4360899, 4363012, Fax : 4360747, 4362884

For further information and details in the field of bio-technology, members may like to contact Dr. Tripathi directly.

(ILA GUPTA)

Secretary

Small, Tiny and Rural Industries Committee

NO. 1/3/99 - IC
GOVERNMENT OF INDIA
DEPTT. OF FOOD PROCESSING INDUSTRIES
PANCHSHEEL BHAWAN, AUGUST KRANTI MARG
NEW DELHI - 110049.

9.11.2000

OFFICE MEMORANDUM

Subject : Cooperating with Hungary in the area of food processing.

In order to have meaningful approach for bilateral co-operation in the area of food processing sector the Hungarian Government has sought specific proposal of the Indian companies and also the states Governments. The Deptt. Has taken up this matter with Hungarian authority. However, if your organization is having any specific proposal to be posed to Hungarian Government the same may please be furnished. The areas identified for the co-operation as far as food processing industries concerned are as under:-

- i) Agro processing, including value addition to fruits, vegetable and aromatics plants.
- ii) Meat and poultry processing
- iii) Milk processing
- iv) Viticulture
- v) Beer production
- vi) Promotion of joint ventures in the aforesaid areas of food processing.
- vii) Participating in promotional and marketing events such as agricultural trade fairs etc.

There is likely to have a high level meeting to discuss these issues shortly. Therefore, it is requested that the information may please be furnished at the earliest.

(S.N. Pandey)
Development Officer
Tel No. 6493227, Fax No. 6493228

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NATIONAL AWARDS
for
Successful Commercialization of
Indigenous Technology

With a view to provide synergetic partnership between industry R & D, the Technology Development Board (TDB) constituted by the Government of India, has instituted two national awards for successful commercials @@ indigenous technology. The national awards are the following:

- I. Cash award of Rs. 10 lakh to be shared equally between on industrial concern which has successfully commercialised the indigenous technology, and the developer/ provider of such technology. In house R& D units can also be the developer/provider of the technology.
- II. Cash award of Rs. 2 lakh - to a SSI unit which has successfully commercialised a product based on indegenous technology.

For the consideration of national awards to be presented in May 2001, the indigenous should have been successfully commercialised after April 1996. Separate application should be made for each indigenous technology commercialised.

Enterprises desirous of compelling for the awards should apply as per the proforma gives below. It should be supplemented with supporting documents. Application complete in all respects should reach on before 15 January, 2001 to -

The secretary

Technology development board.

Department of Science & Technology, Technology Bhawan,
New Delhi - 110016.

Tel. 011-9516073, 6961583

Fax 011-6857643/6524898

PERFORMA

1. Name and address of the application (including telephone/fax nos./e-mail address).
2. Category of the applicant (PSU: Joint Sector, Private Sector: Public Limited Co: Private Limited Co. Registered Partnerships cooperative).
3. It is SSI Unit please give registration details.
4. Name and address of the indigenous technology provider (including telephone / fax nos. / e-mail address).
5. Name address, qualification and designation of the R & D team involved in the development / transfer of technology.
6. Details of technology collaboration, (including date of executive of technology transfer agreement and beneficiaries identified for technology fees, royalty, etc).
7. Details of the product (s) commercialised by the applicant thought such technology after April 1996.
8. Innovative content of the product (s) with respect to competing technologies in India and abroad.
9. Details of patent/design/copyrights obtained/applied for.
10. Details of commercialisation -
 - (a) Date of commencement of the project.
 - (b) Date of commencement of commercial production.
 - (c) Expenditure incurred till commercialisation (Rupees in lakhs)
 - (d) Capacity(s) of financing
 - (e) Source(s) of financing
 - (f) Capacity and utilisation
 - (g) Production figures (year-wise) both physical and financial from April 1996 onwards.
 - (h) Turnover (year-wise)
 - (i) Exports (year-wise) in quantity and money value.
11. Appraisal by the applicant giving full justification on various aspects for competing for the Award.
12. Enclose copies of the Annual Reports for 1995-96 and onwards.

DECLARATION

I certify that all particulars furnished above are correct and complete and I agree to abide by the decision of the technology development board in all matters relating to the Awards.

Place

Date

Signature of the Chief Executive

Name

Designation

Minutes of the meeting of the Standing Committee on Packaged Commodities Rules held at New Delhi on 11.12.2000.

The meeting of the Standing Committee to review the provisions of the Package Commodities Rules was held at Krishi Bhawan, New Delhi, on 11.12.2000 at 1500 hrs. under the Chairmanship of Additional Secretary, Department of consumer Affairs. The list of the participants is annexed herewith.

1 (a). Regarding deletion of provision under the Provision (B) to Rules 6 (1), the Director, Legal Metrology informed that since last two years, as a matter of policy, the Central Government has not been according permission for use of packages bearing particular date of manufacturing at a later date so as this tantamount to giving mis-information to the consumer. The members agreed for deletion of the said provision.

(b) Regarding the existing provision under the Rules for using the wrapper during the proceeding and following month printed on them, it was decided after discussions that the provision be with drawn in respect of "package containing food articles". It was recommend that a proviso be added to rule 6 (1) (d) that for packages containing "food articles", the declaration of month and year of packing shall be as per the PFA requirements.

2. Regarding exemptions from the declaration of month and year of packing provided under rule 6 (1) (A) the following was decided:

- (i). The exemption provided to all the food items be deleted in view of the requirement of declaration of "best before" required under the PFA Rules and proposed addition of the proviso to rule 6 (1) (d) as recommended above.
- (ii). The exemption provided to metallic products, cylinders containing LPG or any other gas be withdrawn it is in the interest of consumer.
- (iii). Withdrawing of the exemption provided to Chemical fertilizer may be considered in consultation with the M/o Agriculture, Dept of Fertilizers.

3. Regarding withdrawing of exemptions provided from the declaration of MRP on packaged under the provisions of rule 6 (1) (C) the following decisions were taken:

- i The exemption provided under C (I) for unpreserved packaged be withdrawn as the value of the product in the package is likely to come down and selling of the package at a price less than the declared MRP is permissible.
- ii The exemption provided under © (ii) be withdrawn as the exemption has been withdrawn already in respect of soft drinks etc which are being returned for refilling and the industry has adopted the practice of printing the MRP, on such bottles.
- iii Regarding withdraw of exemption provided to liquor packages under (C) (iii), the Committee noted that a recommendation had already been made in this regard in its last meeting held on 29-12-1999, and actin may be taken in the light of the views of the State Governments.
- iv With regard to exemption provided to "printing ink" under (C) (vi), it was decided to hear the views of the concerned industry association before taking a final decision.

4. Regarding additional information required in respect of "tyres and tubes" as provided under illustration at (e) of sub-rule 4 to Rule 12. The committee noted that the relevant BIS specification requires declaration

of sizes of tyres and tubes as per international code. The Committee therefore recommended that the requirement of specification of size of tyres and tubes in metric units be deleted and substituted by the words, "the requirements shall be as specified under the BIS specification".

5. As for deletion of Rule 40, the industry associations felt that it is an enabling provision for the Central Government to give permission, since it is up to the committee agreed to recommend the same to the Govt.

6. As regards revision of Third Schedule in respect of Ghee package the Committee, after deliberations, felt that introduction of additional pack sizes (of 250 g and 400g) too close to the existing sizes (of 200g and 500g) will defeat the intention of the Schedule The proposal was therefore not recommended.

7. Regarding the following, it was recommended that a technical committee as suggested in its last meeting held on 29.12.1999 may look into all aspects and make recommendation to the committee.

- i Revision of First Schedule as regards tolerance.
- ii Sub-rule 1 to Rule 11 regarding inclusion of net weight of confectioneries in the net weight.
- iii Deletion of rule 11 (4) and the Fourth Schedule which provides for declaration of the words "when packed" with the net quantity declaration on packages.
- iv Deletion of the provision of double the tolerance limit prescribed in the first and second schedules, at the retailer's premises.

8. After completion of the circulated agenda, the Committee considered an additional agenda regarding imported packages. It was noted that the existing rules provide exemption to the imported packages from the requirements of compliance of third schedule in respect of standard pack sizes for certain products. It was noted that this has placed the Indian manufactures at a disadvantage. Hence the committee recommended that the exemption provided to imported packages in this regard be withdrawn. However on their request, the Chairman agreed that the Industry representatives may consult their Members who are engaged in the import business and send their final views within 30 days (i.e., before 11th of January 2001) for consideration of the Government.

The meeting ended with the vote of thanks of the Chair.

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The report of the Twentieth Session of the Codex Committee on Processed Fruits and Vegetables will be considered by the 24th Session of the Codex Alimentarius Commission (Geneva, Switzerland, 2-7 July 2001).

Part A: Matter for adoption by the 24th session of the Codex Alimentarius Commission.

Draft Standards at Step 8

- (1). Draft Revised Codex Standards for Canned Applesauce (para 29 and Appendix II).
- (2). Draft Revised Codex Standards for Canned Pears (Para. 35 and Appendix III).
- (3). Draft Codex Standards for Kimchi (para 56 and Appendix IV).

Governments to propose amendments or to comment on the above draft standards should be so in writing in conformity with the Guide to the Consideration of Standards at Step 8 of the Procedure for the Elaboration of Codex Standards including Consideration of any Statements Related to Economic Impact (codex Alimentarius procedural manual, Eleventh Edition, pages 26-27) to the Secretary, Codex Alimentarius Commission, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy (fax : + 39.06, 5705.4593; e-mail: codex@fao-org) not later than 30 March 2001.

Proposed Draft Standards and Related Texts at Step 5

4. Proposed Draft Codex Guidelines for Packaging Media for Canned Fruits (Para. 40 and Appendix VIII).

SUMMARY AND CONCLUSIONS

The 20th Session of the Codex Committee on Processed Fruits and Vegetables reached the following conclusion:

MATTERS FOR ADOPTION AND/OR CONSIDERATION BY THE 24TH SESSION OF THE CODEX ALIMENTARIUS COMMISSION:

- Forwards the draft revised Codex Standards for Canned Applesauce and Canned Pear to the Commission for adoption at Step 8 (para. 29 and 35, respectively);
- Forwarded the draft Codex Standards for Kimchi to the Commission for adoption at Step 8 (para. 56);
- Forwarded the proposed draft Guidelines for Packing Media for Canned Fruits and the proposed draft Codex Standards for Canned Stone Fruits to the Commission for preliminary adoption at Step 5 (para. 40 and 78, respectively); and
- Requested the Commission to approve as new work the elaboration of a proposed draft Codex Standard for Korean Insam (Ginseng) Para 80.

MATTERS OF INTEREST TO THE 24TH SESSION OF THE CODEX ALIMENTARIUS COMMISSION AND/OR OTHER CODEX COMMITTEES.

- Accepted the offer of several delegations to prepare proposed draft standards for Canned Citrus Fruits, Canned Tomatoes, Canned Tomato Concentrate, Canned Vegetables, Guidelines for Packing Media for Canned Vegetables, Insam (Ginseng), Jams, Jellies and Marmalades and Soy Sauce for circulation, comment at Step 3 and further consideration at its next meeting (para. 11, 37 and 80);
- Decided to append its Priority List the Revision and Standardization of Processed Fruits and Vegetables to its report for comment and continued consideration at future meeting (para 15);
- Decided to forward Appendix II of document CX/PFV 00/7 to the next session of the Codex Committee on Methods of Analysis of Sampling for endorsement along with additional information provided in written comments submitted at its current meeting (para. 42);
- Returned the draft Codex Standards for Pickled products and for Canned Bamboo Shoots to Step 6 for circulation, comment and further consideration at its next meeting (para. 51 and 64, respectively); and
- Agreed to consider the draft Codex Standard for Aqueous Coconut Products at Step 7 at its next Session on the basis of comment which will be submitted at Step 6 in response to CL 2000/15-GEN (para. 69);

5. Proposed Draft Codex Standard for Canned Stone Fruits (para 78 and Appendix VII)

Governments wishing to submit comments regarding the implications which the proposed draft standing or any provisions thereof may have for their economic interests should do so in writing in conformity with the Uniform Procedure for the Elaboration of Codex Standards and Related Texts (at Step 5) (Codex Alimentarius Procedural Manual, Eleventh edition, Pages 21-23) to the Secretary, Codex Alimentarius Commission, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy (Fax : +39.06.45705.4593; e-mail: codex@fao.org) not later than 30 March 2001.

PART B: REQUEST FOR COMMENTS AND INFORMATION

Governments and interested international organizations wishing to submit comments on the following subject matter are invited to do so before 31 October 2001 to the US Codex Office, Food Safety and Inspection Service, US Department of agriculture, Room 4861 south Building, 1400 Independence Avenue SW, Washington, D.C 20250 (fax: +1.202.720.3157, e-mail : uscodex@usda.gov) with a copy to the Secretary Codex Alimentarius Commission, Joint FAO/WHO Food Standards Program, Viale delle Terme di Caracalla, 00100 Rome, Italy (fax: +39.06.5705.4593, e-mail: codex@fao.org).

1. Priority List for the Revision and Standardization of Processed Fruits and Vegetables (para. 15 and Appendix IX)

The Committee decided to append its Priority List for the Revision and Standardization of Processed Fruits and Vegetables to its report for comment and continued consideration at future meetings of the CCPFV.

2. Draft Codex Standards for Pickled Products (para 52, and Appendix VI)

The committee returned the draft codex standard for pickled products to step 6 for circulation, comment and further consideration of its next meeting.

3. Draft Codes Standards for Canned Bamboo Shoots (para, 64, and Appendix V).

The committee returned the draft codex standard for Canned Bamboo Shoots to Step 6 for circulation comment and further consideration at its next meeting.

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Food Labelling - Trans Fatty Acids in Nutrition Labelling

The Food and Drug Administration (FDA) of USA is reopening to 19 January 2001, the comment period for a document published in the of USA Federal Register of 17 November 199 (64 FR 62746). In that document, FDA proposed to amend its regulations on nutrition labelling to require that the amount of trans fatty acids present in a food, including dietary supplements, be included in the amount and percent daily value declared for saturated fatty acids. FDA also proposed wherever saturated fat limits are placed on nutrient content claims, health claims, or disclosure or disqualifying levels the amount of trans fatty acids be limited as well. Finally, FDA proposed to define the nutrient content claim "trans fat free". FDA is taking this action in response to comments on this issue of whether the agency should define the nutrient content claims "reduced trans fat" and reduced saturated and trans fats".

Submit written comments on nutrient content claims for "reduced trans fat" and "reduced saturated and trans fats" by 19 January 2001. Instructions for commenting are in the fully text of this addendum which is available from the US SPA Equerry Point.

Tel: 020 720 _ 2229; Fax: 202-690-0677; e-mail: ofsts@fas.usda.gov

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi in 20th November, 2000

G.S.R. 876 (E). - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) in the notification of Government of India in the Ministry of Health and Family Welfare (Department of health) number G.S.R, 691 (E), dated the 11th October, 1999 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (I), dated the 11th October 1999 inviting objections and suggestions from the persons likely to be affected thereby the expiry of a period of sixty days from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said Gazette of India were available to the public on the 12th October, 1999.

And whereas the objections and suggestion received from the public on the said draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1) There rules may be called the Prevention of Food Adulteration (10th Amendment) Rules, 2000.

(2) They shall come into force on 20th may, 2001.

2. In the Prevention of Food Adulteration Rules, 1955 in rules 49, after sub-rule (29) the following sub-rule shall be inserted, namely:-

"(30) Tin Plate used for the manufacture of tin containers for packaging edible oils and fats shall conform to the standards of prime grade quality contained in B.I.S. Standards No. 1993 or 13955 or 13954 as amended from time to time or in respect of Tin containers for packaging edible oils and fats shall conform to IS No. 10325 or 10339 as amended from time to time"

[F.No. P-15014/5/98-PH (Food)]

DEEPAK GUPTA, Jt. Secy.

Foot Note:- The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of Gazette of India vide S.R.O. 2105 dated 12-9-55 and were last amended vide G.S.R. No. 770 (E), dated 4-10-2000.

MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 20th November, 2000

G.S.R. 877 (E). - Whereas the draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of Section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954) in the Gazette of India, Extraordinary, part II Section 3, sub Section (I), dated the 10th December, 1999, under the notification of the Government of India in the Ministry of Health and Family Welfare (Department of Health), No., G.S.R. 809 (E) dated the 10th December, 1999 inviting objections from all persons likely to be affected thereby till the expiry of a period of sixty days from the date on which copies of the Gazette of India in which the said draft rules were published were made available to the public.

And whereas the copies of the said Gazette of India were available to the Public the 13th December, 1999.

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby make the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1). These rules may be called the Prevention of Food Adulteration (9th Amendment) Rules, 2000.

(2). These shall come into force after one year from the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955, in rule 32,-

(i) for clause (c) the following shall be substituted, namely :-

"(c) (I) the name and complete address of the manufacture and the manufacturing unit, if these are located at different places and in case the manufacturers is not places and in case the manufactures is not the packer or bottle, the name and complete address of the packing or bottling unit as the case may be;

(II) When an articles of food is manufactured or packed or bottled by an person or a company under the written authority of some other manufactures or company, under his or its brand name, the lable shall carry the name and complete address of the manufacturing or packaging or bottling units as the case may be, and also the name and complete address of the manufactures or the company, for and on whose behalf it is manufactured or packed or bottled;

(III) Where an article of food is imported into India, the package of food shall also carry the name and complete address of the importer in India.

Provided that where any food articles manufactured outside India is packaed or bottled in India, the package containing the such food articles shall also bear on the label, the name of the country of origin of the food articles and the name of complete address of the importer and the primises of the packaging or bottling in India".

(2) Explanation-II shall be omitted.

[NO. P. 15014/4/99 -PH (Food) / DMS & PFA]
DEEPAK GUPTA, Jr. Secy.

Note:- The prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of the Gazette of India vide S.R.O. 2105 dated 21-9-1955 and were last amended vide No, G.S.R. 770 (E) dated 4.10.200.

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MINISTRY OF HEALTH AND FAMILY WELFARE

(Department of Health)

NOTIFICATION

New Delhi, the 20th November, 2000

G.S.R. 878 (E).- The following draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955, which the Central Government, after consultation with the Central Committee for Food Standards, proposes to make in exercise of the powers conferred by sub-section (I) read with sub-section (IA) of Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), is hereby published as required by the said sub-section (I) for the information of all persons likely to be affected thereby, and notice is hereby given that the said draft rules will be taken into consideration on or after the expiry of a period of forty five days from the date on which the copies of the Gazette of India in which this notification is published, are made available to the public;

Any objection or suggestion which may be received from any person with respect to the said draft rules before the expiry of the period specified above will be considered by the Central Government.

Objections or suggestions, if any may be addressed to the Secretary, Ministry of Health and Family Welfare, Government of India, Nirman Bhaan, New Delhi 110011.

DRAFT RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Amendment) Rules, 2000.
(2) They shall come into force after the expiry of three months from the date of their final publication in the Official Gazette.
2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the principal rules), in Appendix "B".
 - (a) in item A. 18.06, the following shall be inserted at the end, namely:- "The foodgrains meant for grinding/processing shall be clean, free from all impurities including foreign matter (extraneous matter)";.
 - (b) In each of the item A 18.06.01, A. 18.06.02, A. 18.06.03, A. 18.06.04, A. 18.06.05, A. 18.06.06, A. 18.06.07, A. 18.06.08, A. 18.06.09, A. 18.06.10, A. 18.06.11, A. 18.06.12, A. 18.06.13, and A. 18.06.14 - (I) standard (ii) the following standard shall be substituted, namely :-
 - (ii) Foreign matter (Extraneous matter) - Not more than 1 percent by weight of which not more than 0.25 percent by weight shall be mineral matter and not more than 0.10 percent by weight shall be impurities of animal origin".

(2) Standard (viii) shall be omitted:

(c) in item A. 18.06.04.

(1) for standard (ii) the following standard shall be substituted, namely:-

"(ii) foreign matter (Extraneous matter) - Not more than 1 percent by weight of which nor more than 0.25 percent by weight be mineral matter and not more than 0.10 percent by weight shall be impurities of animal origin".

(2) Standard (viii) shall be omitted.

[No.P.15014/11/2000-PH(Food)]

DEEPAK GUPTA, Jt. Secy.

Note : - The Prevention of Food Adulteration Rules, 1955 were published in Part II, Section 3 of the Gazette of India vide S.R.O. 2105 dated the 12th September, 1955 and were last amended vide G.S.R. 770(E) dated the 4-10.2000.

GOVERNMENT OF INDIA

Directorate General of Foreign Trade (DGFT), Ministry of Commerce and Industry,
New Delhi, dated 24th November, 2000.

GOVERNMENT IMPOSES COMPLIANCE OF STANDARDS ON IMPORTS

The government has imposed compliance of all the conditions of the Standards of Weights and measures (Packaged Commodity) Order, 1977 on imports, as applicable, on domestic producers through a notification issued by the Directorate General of Foreign Trade (DGFT) on November 24, 2000. In addition to other requirements, the importers of packaged commodities have to comply with the following conditions.

- a. Name and address of the importers.
- b. Generic or common name of the commodity packed.
- c. Net quality in terms of standard unit of weights and measures. If the net quality in the imported package is given in any other unit, its equivalent in terms of standard units shall be declared by the importer.
- d. Month and year of packing in which the commodity is manufactured or packed or imported;
- e. Maximum retail sale price at which the commodity in packaged form may be sold to the ultimate consumer. This price shall include all taxes local or otherwise, freight, transport charges, commission payable to dealers, and all charges towards advertising, delivery, packing, forwarding and the like, as the case may be.

The notification also makes import of 131 products subject to compliance of the mandatory Indian quality standards as applicable to domestic goods. For compliance of this requirement all manufacturers/ exporters of these products to India shall be required to register themselves with Bureau of Indian Standards (BIS). The list of 131 products include various food preservatives and additives, milk powder, infant milk food, certain kinds of cement, house hold and similar electrical appliances, gas cylinders and multipurpose dry batteries.

APEDA NEWS

Letter dt 28th Nov 2000 from APEDA on Pesticide Residues in Exportable Commodities

Dear Sir,

As you are aware that importing countries have laid down very stringent conditions for quality particularly with respect to pesticide residues levels for fresh and preserved food products. Keeping this in view, APEDA suggests that all the consignments of its schedule products may be tested for pesticide residues levels to achieve objective of ensuring pesticide residue levels within permissible limits. In order to support the exporters in testing pesticide residues, APEDA has come out with a Scheme for reimbursement of expenses for testing of residues for all APEDA's schedule products. As per this scheme, the pesticide residue test report should clearly establish linkage between the consignment procured and the consignment being exported. The test has to be conducted in advance by taking the samples of the produce in accordance with the laid down pesticide at the field level. This requires that the exporters should get the pesticide residues tested in the recognized laboratories by APEDA. The list of the recognized laboratories for this task is also enclosed at Annex I.

This scheme for reimbursement

of expenses incurred for pesticide residue testing is applicable for all APEDA's schedule products with immediate effect. The main conditions of the Scheme are as follows :

1. The test will be conducted for only those chemicals which are either banned or where there is a possibility of having higher residue levels than permissible. If any additional chemical has been tested, the reasons for the same may clearly be indicated.
2. APEDA will reimburse expenses to the extent of 50% subject to a maximum of Rs. 2,000/- per sample. The laboratories identified by APEDA have agreed for the test charges amounting to Rs.300 for each pesticide tested, subject to a minimum of Rs.1500 per sample and maximum of Rs.3,000/-.
3. The sample will be tested only from the approved laboratory (list enclosed).
4. The payment shall be made on reimbursement basis. The payment shall be made by the exporters to the concerned laboratory and they will be apply for reimbursement to APEDA, along with the bills

and the test reports. Only those payments will be cleared where the test report is received along with the claim.

5. The request may be sent in the prescribed application form along with the following :

- Bills related to testing
- CA Certificate, pertaining to the payment

Thanking you,

Yours faithfully,

A S Rawat
Dy. Director



LIST OF IDENTIFIED LABORATORIES

1. M/s. Geo-Chem Laboratories Pvt. Ltd.,
26/27/28/34, Raja Industrial Estate,
1st Floor, Purushottam Kheraj Marg,
Mulund (West), Mumbai- 400 080.
Tel: 022 5690611/ 5642021
Fax: 022 5653641
2. M/s. Vimta Labs Ltd.,
142, IDA, Phase-II,
Cherlapally, Hyderabad-500 051.
Tel : 0407124141
Fax : 040 7123657
3. M/s. Reliable Analytical Laboratories
221, Amar Gian, Opp. S.T. Workshop
L.B.S. Marg, Thane - 400 601
Tel. 022-5471279/ 5476801
Fax: 022-5470968.
4. Shriram Institute for Industrial Research.
19, University Road, Delhi - 110 007
Tel. : 7257676, Fax : 7257676

5. Shiram Institute for Industrial Research
14-15, Sadarmangala Industrial Area,
Whitefield Road, Bangalore-560 048
Tel. : 080 8452166
Fax. : 0808452734
6. Mahatma Phule Krishi Vidyapeeth,
Rahauri - 413722
Distt. Ahmednagar, Maharashtra
Tel. : 02426-43240.
7. National Horticulture Research &
Development Foundation
Post Box No. 61, Kanda Batata Bhavan
2954 E, New Mumbai Agra Road
Nashik - 422 001,
Maharashtra
Tel : 0253 592523 / 592531
Fax : 0523 591606.
8. Insecticide & Residue Testing Laboratory
Krishibhavan
Shijajinagar
Pune - 411005 M.S.
Telefax : 020- 324348
9. Jai Research Foundation
Post Box No. 30, G. I. D. C.
Vapi-396 195 (Gujarat)
Tel : 02638-23484.



**Nomination of Awards for
Outstanding Export
Performance for the year
1999-2000 under 'FOCUS-
LAC' Programme.**

APEDA is collecting applications for nomination of the above award to be given to the exporters including those companies who enter the export trade from the financial year 1998-99. However there should be a minimum of 10% increase in export turnover in 1999-2000 over 1998-99 turnover.

If you wish to give your name for above award and for any further information may please contact Ms. Gowri Sundram.
Dy. Director, APEDA, IIIrd

floor, NCUI Building, 3 Siri Institutional Area, August Kranti Marg, New Delhi - 110016.
Tel : 651-3204/4572/3219, Fax : 6513167.



**Agri Export Programme
Organised in J&K**

In collaboration with J&K SIDCO, APEDA organised a two day agri export awareness programme at SKICC, Sringara on 25th and 26th July.

The main objective of this programme was to ascertain the difficulties in export of various Agri items from the state, and to create awareness about the optential of agro produdcts export of J&K, including the activities and programmes of the organisation for the benefit of exporters. APEDA has opened a virtural office in the premises of J&K SIDCO so that local esdporters can have easy access to information and assistance locally. Prior to this two day awareness programme APEDA had convened a meeting with apple growers in June.2000.

Where approx. 20 growers were present. APEDA is planning to conduct integrated Training Programme for apples in Kashmir, whereby growers/farmers/exporters will be imparted training on pre and post harvest techniques so-as-to make the produce globally

competitive. This two day programme was a precursor to this broad programme.

The tow day programme was inaugurated by Mr.I.S.Malhi Financial commissioner (Agriculture), Govt. of J&K. Congratulated APEADA and J&K SIDCO for this pioneering step taken in strengthening and developing the exports of horticulture produce from J&K. He mentioned that food processing industry is very crucial for the development of J&K state, especially for creating employment opportunisties in the rural areas as well as to provide the marketing opportunities for agricultural produce by the farmers both for domestic market as well as exports from J&K.

Principal secreatary (I&C), Mr.Mohd. Shafi pandit called upon exports and growers present at the seminar to make best use of the opportunities made available to them by various agencies including APEDA. He suggested APEDA to introduce this type of integrated training programmes for other produce also in the coming future.

Mr.G.Q.Wani, Managing Director, J&K SIDCO, stated that the removal of quantitative restrictions under obligation of WTO has exposed our horticultural products to stiff competition with the

horticultural products of other countries and the criteria today before the consumer is good quality at an affordable price whatever the source. He stated that such type of programmes are need of the hour.

In this programme Secretary, Horticulture, Mr. G.A.Dar, Vice Chancellor, SKUAST, Dr. M. A. Kamal, Deputy Secreary, Deptt. of food processing Industries. Govt. of India, Mr. A.K.Goyal, senior officials from APEDA Mr. Tarun Bajaj and Mr.Vinod K kaul, Mr. Sajad R.Qadiri, Representative of APEDA, virtual office at Srinagar, Mr.Ranbir Singh, Deputy Director, National Horticulture Board, New Delhi and other senior Government officials were present and made valuable contributions.

This programme was attended by more than 250 growers of apples, walnuts etc. exporters and senior Government officials connected with export related activities. Mr.G.R.Bhatt, President, Fruits Association, talked about problems and prospects of fruit growers.



Integrated Training Programme of APEDA in the Horticulture Sector

Agro Products have been identified as one of the potential products for increasing the export potentiality of our

country. India holds a place of pride as the largest producer of horticulture products in the world in general, for mangoes in particular. Yet our presence in the world trade, is not predominant. Considering India's strengths, it is possible to work out for an effective action plan to ensure India as a leading horticulture exporter in the near future.

In this regard, APEDA initiated a programme for integrated training of horticulture producers for some identified fruits like grapes, mangoes & lychees, and awareness programmes for grapes, mangoes, banana, acid lime/sweet lime, oranges, pomegranates & fresh horticulture perishables in the selected regions

In each of the identified products and regions, the integrated training programme aimed at pre-harvest, harvest and post harvest management activities include.

1. Selection of Orchards
2. Pesticide Residue Management
3. Integrated Water Management
4. Nutrient Management
5. Pest and Disease Management
6. Fertilizer Management
7. Storage, Grading & Packing
8. Transportation

For this a technical

coordinator has been appointed who looks into all the technical aspects like preparation of curriculum, scheduling of training programmes, coordinating with the training institutions and monitoring the end results. The technical Coordinator will visit the identified orchards and document the impact of pre-harvest, harvest and post-harvest training programmes, based on which the curriculum for the subsequent years will be suitably devised, to make it more effective and finally for the qualitative production of our Horticultural Products.

The technical coordinators are generally appointed from the respective identified regions so that the person is fully conversant with the concerned horticulture crop and local conditions and will be able to provide necessary technical guidance without much difficulty. The Agricultural University or state Horticulture Directorates are preferred for such training programmes by APEDA.



Introduction of Barcoding in Indian Agricultural and Processed Food Products for Exports :

Most of the agricultural products are now traded with barcodes which help easy tracing

and tracking of the origin of the produce as well as inventory control and pricing. The importers/distributors as well as retailers in most of the importing countries find it convenient to market products with barcodes. It gives an impression to the buyers of quality and inventory systems being followed in the exporting country. Moreover, it would provide value addition to the products. It is with this in view that APEDA proposed to introduce barcoding in various items of exports from India.

EAN India, a body set up under the ministry of Commerce, has a mandate promoting EAN International Standards on article numbering and barcoding in India. It is a non-profit organisation. Ministry of Commerce has fixed target of achieving a reasonable level of barcoding in 2-3 years.

Information such as EAN article number when represented graphically as barcodes facilitate automatic product-related data collection as the product travels from its point of origin to its point of sale. Barcodes can be scanned (decoded) and entered in the computer at a very high speed (typically microseconds), and with 100% accuracy using a barcode scanner. Barcode scanner when connected to a computer (or a portable device)

running in-house application may be used to generate meaningful track and trace information for the product/consignments.

In case an exporter introduces barcoding for his products, his expenditure would be Rs. 20,000/- for a lifetime membership of EAN plus Rs. 3,000/- annual fees for the barcoding services. With a view to encourage our exporters, APEDA proposes to bear the one time expenditure of Rs. 20,000 per exporter. The annual expenditure of Rs. 3,000/- will have to be borne by the exporter himself.



Awareness Programme on Quality Assurance and Quality Management Systems

APEDA in collaboration with U.P. State Horticultural Corporation Marketing Federation organised an Awareness Programme on Quality Assurance and Quality Management Systems at Lucknow on 7th and 8th September 2000. The programme was inaugurated by Mr. Rai Singh, principal Secretary, Agro Industries, Agri. Export Promotion, Horticulture & food Processing, Govt. of U.P.

More than 50 participants including entrepreneurs, Exporters from different agro based industries and officials of

horticulture & food processing Department and other related governmental agencies attended the programme.

The awareness programme was organised with a view to create awareness of the systems and their implementation as these were becoming an essential requirement for international trade. The programme covered topics including: Quality-the emerging global scenario including WTO Agreements, export Scenario-Current Status. APEDA's initiative for Horticulture sector fringed potential areas of export, quality management systems viz. ISO 9000 and Hazard Analysis Critical Control Point (HACCP) System. Resource persons for the programme included Ms. Vidyottama Tripathi, Consultant (Quality) from APEDA and Dr. Namrata P. Wakhloo, Pradigm services Pvt. Ltd. Pune.



Awareness Programme on Production, Processing and Marketing of acid Lime, Conducted in Indi Taluk, Bijapur District, Karnataka

The Awareness programme was conducted on 18th August 2000. Shri Basangouda Patil, Hon'ble Member of parliament from Bijapur inaugurated the programme and urged the farmers to form an association

with their counterparts in Maharashtra, which in turn will help them in getting good prices for the produce. He also stressed about the importance of using acid lime as a soft drink instead of aerated waters. Mr. Saranappa S., Member of Legislative Assembly, Sindage, in his address expressed his happiness on such programme being conducted at Indi Taluk and told the farmers to avail the benefit from the state and central governments to the maximum extent.

Shri Y.B.Pati, Board Member, APEDA, in his chief Guest address, promised the farmers that he will try to set up a lime processing unit with the help from other entrepreneurs. Shri D.B.Sabharwall, secretary, APEDA, in his Presidential Address explained about its various schemes of the department and also distributed seedlings to the farmers.

Dr. A.R.Desai, Technical Coordinator, APEDA, welcomed the gathering. Mr.R. Ravindra, field Officer, was also present.

The technical sessions covering production technology, pest and disease management, post harvest handling etc. were dealt by Dr. G.K.Mukund, Associate Professor (Horticulture); UAS, Bangalore, Dr.K.V.R.Ramana, Scientist, CFTRI, Mysore, and

Dr. D.R.Patil, Associate Professor, college of Agriculture, Bijapur. Mr.Saleem Sagar, major exporter off acid lime, shared his experiences with the farmers .There was a lively interaction between the farmers and the resource persons. About 400-450 farmers attended the programme.



Mango CA Container Participation of Private Sector

APEDA has introduced a scheme to encourage private sector efforts to utilise R&D protocols developed by it for export of fresh fruits and vegetables by sea under its Financial Assistance-"Scheme for Generating Relevant Research & Development by APEDA through Reaserch institutions for Common Banefit of Trade and Industry".

Presently export of perishables is being done mostly by air. Since that air freight rates have been increasing every year, the demand for export of fruits and vegetables from India has suffered. This was further compounded by the fact that some of the competing countries developed technology of export by sea containers where the freight costs are considerably low. It therefore, became imperative for India to develop similar technology to counter this competition. APEDA took

this initiative and developed various protocols for different varieties of mangoes and lychees with the help of consultants from within the country and abroad. A few shipmkents have also been made over the last three years, especially in the case of mangoes and lychees with the use of this technology. Each year improvements have been brought about in these shipments, through such commercial shipments which have been undertaken through the public sector agencies where in APEDA had underwritten losses to a certain extent. Since most of the exports of fresh fruits and vegetables are undertaken by the private sector, it has been felt necessary that they should also be encouraged to undertake commercial shipoments in sea containers.

Benefits of the Scheme are:

- Increase in the competitiveness in overseas markets
- Increase in the export volumes, and in turn India achieving higher benchamark in the overseas markets
- Improvement in the quality of fresh produce exported from India
- To strengthen backward integration through infrastructure development
- Increase in the farmer's income through elimination of middlemen, and
- Encourage investments in R&D efforts by the private sector

Items Selected are : ●Mangoes, ●Lychees, ●Papaya, ●Citrus, ●Banana, ●Custard Apple, and ●Vegetables

Destinations covered under the scheme are: ●North America ●West Europe, and ●Far-East (Japan, Hongkong, Philippines)

This scheme is open only to exporters having approved packhouses with requisite washing, grading/sorting, hot water dip treatment, pre-cooling & cold storage facilities. Such exporters should also be able to establish availability of unhindered cold chain including availability of reefer/insulated vans. Secondly, the availability of intermediate storage and proper transport facilities to the extent of farm level. Thirdly, the exporters should be able to demonstrate value addition in products exported. Fourthly, the farms/orchards from where the produce is sought to be sourced should have been involved in total pre harvest management under the supervision of APEDA's scheme for integrated training programme. And lastly,

the exporters must have proven capability controlling and monitoring pesticide residues in the produce sought to be exported. Details regarding the scheme are available in APEDA's offices.



Implementation of Hazard Analysis Critical Control Point (HACCP) Systems in Mango Pulp Processing Units in Gujarat Region

APEDA has successfully implemented HACCP systems in the mango pulp processing units in Krishnagiri and Chittor districts. In order to create awareness about HACCP and its recognition in international trade, APEDA motivated mango pulp processing units of Gujarat region to implement HACCP as it is now becoming pre-condition for export of most of the agriculture produce. Presently, five units have been taken up for implementation of HACCP in a group project. These units are situated in

Baroda and Valsad region of Gujarat. An outline of implementation of HACCP in the above unit is as follows :

1. Identifying improvements in the five mango pulp processing units and assisting them in carrying out the same.
2. Development of entire quality assurance documentation including HACCP plan and essential ISO9000 requirements.
3. Training for personnel of five units at three levels:
 - Top Management
 - Supervisors / Chemists / Operational Staff
 - Contractual and other Labourers/ Workers.
4. Assisting in getting the units certified through the third -party certification body.
5. Assisting units in complying with the observations raised during the third party certification.



FAIRS AND SEMINARS

**Distance Education Programme
in Packaging Correspondence
Course, VI Batch, January 2001
- June 2002**

The above Course of 18 months is being organised by the Indian Institute of Packaging, Bombay, which is a national institute of great standing in the field of Research and Education in Packaging.

For details of the course, please contact :

Indian Institute of Packaging
E-2, MIDC Area,
Post Box No. 9432
Andheri East,
Mumbai - 400093.
Tel : 8219803/8219469
/8216751
Fax : 91-22-8375302
E-mail : iip@bom3.vsnl.net.in



**Agri-Expo 2001, 17th - 20th
Feb., 2001, Lucknow**

The above Expo is being organised by M. J. Khan, Director, New Delhi at Laxman Mela Ground, Lucknow.

Interested Persons/Parties/Companies may please contact for further details to AgriExpo 2001, G-30, Lajpat Nagar - II, New Delhi - 110 024. Ph :

6910927, 6910928, 6316747,
Fax : 6849107, 6922747, E-
mail : agricult@del3.vsnl.net.in



**Aahar 2001 : March 17-21,
2001 at Pragati Maidan,
New Delhi**

The Aahar 2001 will be held from March 17-21, 2001 at Hall No. 14, Pragati Maidan, New Delhi. This International exhibition is being organised by ITPO. Apeda has made arrangement for inviting a number of Buyers from different parts of the world and like previous occasions, special Buyer-Seller-Meet will also be organized for the participants. The theme of Aahar 2001 will be to intimate the international buyers that India is conscious of the quality requirements of the international market and the Indian industry and exporting trade are capable of delivering the goods as per the specifications prescribed by the buyers.

Industry members/Companies/persons wishing to display their products for export purposes may contact, for more details: Shri S. S. Nayyar, Asstt. Secretary, APEDA, 3rd Floor,

NCUI Building, 3 Siri Institutional Area, August Kranti Marg, New Delhi - 110 016, Tel : 011-6516245(D)/6513204 (Extn.220) Fax : 011-6534870/6514564, E-mail : trade@apeda.com



**Panama's Commercial
Exhibition, 7th to 12th
March-2001**

The above exhibition is being organised from 7th March to 12th March-2001 in Panama City, Panama.

Panama is an important player in the world of business; therefore any Commercial Exhibition held there is of great interest. Businessmen from all over the world converge on Panama in March each year to participate in this fair.

Parites/Companies/Persons interested to participate in this fair may please contact Mr. Alejarndro A. Garrido A., Ambassador of Panama, Embajada De Panama, P. O. Box 3168, Jor Bagh, New Delhi - 110 003 Tel : +91 (11) 4642518, 4627890, Fax No. +91(11)4642350, Email : panaind@bol.net.in.



NEW MACHINES / PRODUCTS

Speed and service for large-scale manufactures

With the aim of replacing the current generation of filling machines, SIG combibloc introduced a new generation of aseptic carton filling machines In 1999. The new series, which includes the CFA112 currently in use in Thailand, differs from predecessors in having four tracks for operation. (as opposed to two previously), less moving parts. Many single -functions and components are now integrated into function units with modular construction.

According to SIG combibloc, the CFA112's capacity of 12,000 packs per hour outperforms the current market benchmark of 6,000-7,000 packs. The system fills small-sized combiblocmini packs form 125ml to 250ml sizes, and for its performance, just 10.4 square metres of floorspace is required. Wastage is kept below one percent.

The machines can handle up to six packs sizes, changeable within or less than five minutes. A single operator can be trained to control two units easily, using customised touch-screens and operating data processing assist operators. Remote control interfaces allow for on-line

link -up with combibloc service engineers when necessary.

Apart form the machines, combibloc plays an active role in assisting clients during the packaging and graphic design stage. Modern design studios in Thailand, Taiwan and China have been set up expressly to cater to packaging design needs .The company is also able to create specially customized design on request.

The design service includes market research on beverage/dairy trends, consumer preferences, segmental analysis and introduction of successful ideas form other parts of the world. From the Rayong center, additional services are given in the form or pre and after-sales technical support, encompassing project engineering, technical services, training, R&D and preventive maintenance.

Asia Pacific Food Industry Aug 2000



Smart filler for babyfood and juices

THE DEMAND for sanitary and easy- to clean systems has led Zanichelli Meccanica (Zacmi) of Italy to design a new type of filler called the 'Smart Filler' This machine is composed of a carousel where

the filling heads are positioned .There is practically no tank and the product is distributed to the valves through a central collector which is hermetically closed.

The filling operation occurs by means of valves which electronically control the quantity of product. This gives to the machine high flexibility. it allows filling with great accuracy from 1 to 5,000 grams without changing nozzle or valve. Furthermore, the system totally avoids product recirculation.

A special device permits the filling of liquids such as milk, citrus fruit juices, etc., without the formation of foam, which is ideal for baby foods. The machine can be used for any rigid container such as glass jars, aluminium and tinsplate cans and plastic bottles (PET, PVC, LAMICON).

The machine allows both cold and hot filling without affecting filling accuracy. The valve is equipped with an automatic device to close the filling nozzle, which avoids dripping and guarantees a high filling constancy without getting the container dirty. The filler is supplied with a fully integrated automatic C.I.P systems which provides a perfect and accurate cleaning process, as well as real steam sterilisation.

A self-diagnostic system for each individual head is available, which monitors all functions. There is also a fully automatic heating phase before start-up and an emptying phase at the end of production. The filler can be supplied as a single unit or in a mono-block with container washing and capping machine.

Asia Pacific Food Industry Aug. 2000



No tears with Korean onion juice

What will they think of next? The Hyundai Farming Union Corp. (HFUC) has produced a new beverage dubbed Natural Onion juice using bulbs grown in the fertile MooAn district. Said to be the first of its kind, the juice was developed by the Korean Food Research Institute with support from Mokpo university and KyungBuk Science University.

The onion juice comes with added dietary fibre and vitamin C, plus a pinch of pear juice for flavour. HFUC recommends it as a healthy family beverage, especially after meals to ward off the after taste of meat and fish. Easy on the stomach, the juice is also said to have 'cleansing' properties and aids the recovery rate after exercise. It also is reputed to mix well with hard Korean liquor.

Packing options include a 120ml single serve glass bottle with peel off cap; 350ml and 1.5

liter PET bottles; and a 100ml pouch of onion juice concentrate for making both hot and cold beverage.

Asia pacific food Industry Aug2000



Reverse Osmosis Systems

Aqua clear offers a range of reverse osmosis systems. It is used in desalting brackish water, producing pyrogen free water for pharmaceuticals phot5ogtraphuy and food processing industry and ultra pure water for the semi conductor and electrical industry besides waste water recovery. It is also used for the fdoncentration of antibiotics, sugar fruit juices, enzyme s etc, Applocations are in water treatment, metal industry, chemical industry, pharmaceutical industry, The company also offers ultra filtration systems for same application.

For more details write to:

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Near kalupur Co-po bank,
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Indian food Industry July-Aug 2000



High throughput flaker for breakfast cereals

Good news for cereal producers Buhler AG has launched a series of flaking roller mills for making

breakfast cereals that meet all the requirements of food processors.

The modular design of the Buhler BCFA series flaker allows for short supply times and optimal matching to specific customer needs. With a small footprint and variable drive configuration, the flaker can be installed in any plant.

The roller mill's high efficiency is the result of a significant throughput increase; an efficient roll cooling system and centrifugally cast Buhler rolls designed to withstand high roll pressures for a long life. Control systems are based on an easy to understand method, for quick learning and easy operation.

Cleaning and maintenance downtime is substantially reduced by a new sanitation and servicing concept; for instance, both rolls can be easily removed from the operator's side. A novel design applied for the first time on flaking roller mills effectively suppresses vibrations caused by rough flaking operations, enabling installation with no special building measures.

A high precision gap roll adjustment mechanism operating in the range of hundredths of millimeters ensures consistently high flake quality. As flake quality is influenced by the accuracy of material feed, all BCFA mill feeders operate across a very narrow roll-width distribution range.

Asia Pacific Food Industry Oct. 2000



Carrot adds flavor to rice vermicelli

A new twist to an age old Chinese staple comes in Golden Boy carrot rice vermicelli by Fujian Provincial Cereals, Oils & Foodstuffs Import / Export Corporation.

Made from carrots, rice and water, the vermicelli is sold in 250g packs, good for four servings. Each 62.5g serving contains 927kJ of energy, 4.88g protein and just 0.03g fat, so noodle enthusiasts need not fear that with added flavor comes additional calories and fat.

To prepare, soften the vermicelli in hot water for one to two minutes, then stir-fry with vegetables and meat, or simply boil in soup. The vermicelli can also be deep fried and served as an accompaniment to congee or stir-fried dishes. The attractively orange tinged vermicelli requires little garnishing and is a good, inexpensive solution for entertaining guests or for a no fuss wholesome meal.

Asia Pacific food Industry Oct. 2000



Raw material for making 100% biodegradable film

By virtue of its expertise in modified polymer technology and innovativeness in manufacturing specialized poly films, the offer making company has developed a new product; i.e., Environment

Friendly 100% Biodegradable Polythene Granules. The company specializes in the manufacture of rust preventive (VCI)LDPE and Antistatic polythene bags/ sheets and rolls. These products have been well accepted by large customers for packing their goods. All products manufactured currently confirm to international and domestic standards and have been tested and certified by India's topmost government agencies, technical institute etc. Film manufactured by using this raw material has a normal film like appearance and excellent heat sealability. Film can be manufactured upto a low thickness of 20 microns.

Areas of Application: Polythene bag industry and other applications.

Advantages: Highly environment friendly, Meets a major requirement, Wide ranging applications, Product already established in the market.

Stage of Development: Commercialized. **Economic Data:** Current cost of the product is approximately 30% higher than normal on a micro scale basis. However efforts are being made to

secure concessions in excise (production) and sales tax so that the cost can work out close to the cost of normal polymer. **Transfer Forms:** Know-how, Technical assistance, joint venture with an established company in this line. **Target Countries:** Worldwide

TBSE Newsletter Sept- Nov., 2000



Edible protective coating for food and agricultural products

The need to prolong the shelf-life of food products, in particular fresh produce, without harming quality, is well recognized. A tailor-made coating which is product specific and therefore offers better adhesive properties would be advantageous relative to existing methods. The method can be applied to a wide variety of agricultural and food products. The coating technique itself, and the understanding of the mechanism and stages involved in coating fruits and vegetables, could lead to applications for many agricultural products. **Areas of Application:** Preservation of fresh fruits/ vegetables. **Advantages:** This simple coating technique for food and agricultural products can be either consumed or easily removed and is biodegradable. **Stage of Development:** Patent is pending. **Transfer Forms:** Know-how, Consultancy, Licensing, Negotiable

TBSE Newsletter Sept- Nov., 2000



Dry Dehulling Technology for Sesame Seeds

The Central Food Technology Research Institute (CFTRI), Mysore, has developed a novel technology for dry dehulling of sesame seeds that provides seeds of quality, meeting the national and international standards. Traditionally, sesame

are dehulled using wet and chemical methods. Not only does the traditional method leads to wastage of substantial quality of precious water but the chemical treatment sometimes also bears upon the digestion of seeds. The novel CFTRI dehulling technology, on the other hand, does not use any chemical or bleaching agents. The semi-dry process uses minimal amount of water and incorporates a purification and recycling system to ensure efficient usage of even the small amount of water employed besides eliminating the effluent disposal problems. The process also results in a considerable higher yield than that from traditional methods, and 80% of dehulled seeds can be obtained using the CFTRI method. It is a continuous process and therefore requires no yard drying or manual handling which reduces the chances of contamination by bird or rodent excreta.

CSIR News 15 Sep. 2000



Plastic Wrap to Detect Spoiled Food

A Canadian company is developing a plastic food wrap that will change color if food is contaminated with dangerous bacteria, *New Scientist* magazine has said.

The Toronto based Toxin Alert's wrap will contain anti-bodies that stick to the inside of the wrap and are activated when it touches spoiled food.

"The wrap will be made to detect *Salmonella*, *Campylobacter*, *Escherichia coli* 0157 and *Listeria bacteria*," the weekly science magazine said, referring to common causes of food poisoning.

The company said the product would cost about 25 percent more than ordinary wrap. It may also be adapted to detect pesticides or even proteins characteristic of genetically modified (GM) foods. "This should be affordable for everyone. If you can afford a sandwich bog, you should be able to afford one of our sandwich bags," Mr. Gord Fuzer, the Vice-President of the company told the magazine.

The wrapping is composed of separate layer to capture and detect the bacteria. The inside surface has the antibodies. A top layer contains a nutrient gel that holds another set of antibodies attached to a colored chemical process. "Finally there is a porous layer that makes contact with the food and allows disease causing organism to pass through the nutrient gel," it said.

Once the organisms are captured, and colored, they diffuse towards the antibodies stuck in the inner layer in the form of an X, making it visible.

Mr. Furzer admitted the wrap was not sensitive enough to detect small amount of bacteria which could still make people sick. "What were are looking at is stopping gross contamination that cause mass illness and death."

Indian Food Industry July Aug. 2000



SPIC Develops Detection Kit to Save Bananas

SPIC Science Foundation has developed a super sensitive detection kit for banana bunch top virus. The technology package funded by SPIC was developed by a team of scientists in association with Tamil Nadu Agricultural University. It is said that banana bunchy top virus is a devastating disease in bananas and plantains which nearly wiped out hill varieties popular in Tamil Nadu. This had caused huge loss to the farmers. The new kit is considered a boon to tissue culture industry, plant quarantine and plant health monitoring agencies. Virus free mother plants can be unequivocally identified by this method and multiplied in large numbers by tissue culture serving as an effective means to prevent the huge losses, SPIC press release said.

Indian Food Industry July-Aug. 2000



Alfalfa, a substitute for Soy

European Union-funded researchers have developed a method to extract proteins from alfalfa leaves, which could replace soy in food and animal feed and have major trade implications.

The new protein extraction method produces an additive with four times the nutritional value of the protein now produced from

New Machinees / Products

leaves, which could replace soy in food and animal feed and have major trade implications.

The new protein extraction method produces an additive with four times the nutritional value of the protein now produced from alfalfa, a leguminous plant with clover like leaves and flowers.

Unveiling the new science, the European Commission said the technique yielded protein known as Rubisco with a nutritional value similar to cow's milk and slightly

superior to soy, most of which has to be imported into the European Union.

Its applications range from a high-value additive to animal feed to an ingredient in food as well as used by the cosmetics and pharmaceutical industries.

It has been tested successfully in different food products such as sauces, sausages and liquid desserts.

The Commission said the technology was owned by Sweden's

Alfa-Laval, which would ensure its wide exploitations.

A Dutch ingredients company, Orffa, was also part of the research consortium and would manufacture and sell Rubisco based products for food applications. Rubisco - was expected to be granted EU approval soon and could soon substitute for soy, imported from the US, Argentina and Brazil, as a source of vegetable protein.

Indian Food Industry July Aug. 2000



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RESEARCH ARTICLES

STANDARDIZATION OF METHOD OF JUICE EXTRACTION FROM KOKUM FRUIT

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ABSTRACT

In the present investigation, the *Kokum* fruit was studied for its physico-chemical parameters. It was found that, average weight of the Kokum fruit was 22 g while average weights of seed and rind were 12.3 g and 11.00 g, respectively. The average polar and equitotial diameters of the fruit were found to be 5.40 cm and 5.83 cm, respectively. The specific gravity of fruit was found to be 1.17. It was also noticed that, the juice yield of Kokum fruit was found to be higher in hot method of extraction as compared to cold method of extraction. Among the various temperatures employed for heating the kokum crush, 60°C was found to be the best as far as juice yield, total soluble solids and pigment extraction of kokum fruit was concerned.

INTRODUCTION

Kokum (*Garginia indica* Choisy) is an important member of the family Guttiferae and found in tropical rain forests of Western Ghats from *konkan* to Southwards in Mysore. It is a slender evergreen tree with drooping branches and flowers in November-February and fruits ripen in April-May. The ripe *Kokum* fruit has an agreeable flavour and sweetish acid taste. The bright red coloured fruit juice can successfully be used in beverage industries. The ripe fruit juice is mostly used for preparing the cooling syrups in hot months (Anon, 1976). The *kokum* fruits in Konkan region are presently used for

commercial preparation of syrup in which fruit rind is mixed with cane sugar in 1:2 proportion. There is a paucity of information on extraction of juice from *Kokum* fruit. Keeping in mind the present investigation was undertaken to standardise the method of juice extration from the *Kokum* fruits.

MATERIALS AND METHODS

The *kokum* fruits were brought from the Experimental Orchard of Department of Horticulture, Konkan Krishi Vidyapeeth, Dapoli. The fruits were washed throughly in running water and studied for its physical parameters such as, average weight of fruit, seed and rind, average

diameter(polar and equitorial) and specific gravity of fruit. The fruits were separated into rind and seeds. The rind was made into fine pieces, which were then employed for extraction of juice by using cold and hot methods of juice extraction. In the hot method of juice extraction, the crush was heated at various temperatures such as 30, 40, 50, 60,70,80, and 90°C. The heated mass was then pressed for juice extraction. The juice was filtered and pasteurised at 85°C for 25 minutes. The juice was also used for determination of various physico-chemical parameters given below:

1. **Specific gravity of juice:**
Specific gravity of juice was

determined by dividing mass by volume. A unit was measured and weighed exactly.

2. **Total Soluble Solids (TSS):** Total soluble solids were determined with the help of hand refractometer.

3. **pH:** The hydrogen ion concentration was determined by using an Elico pH meter at 22°C.

4. **Acidity:** The total acidity was determined by the method of AOAC (1975) in terms of per cent citric acid.

5. **Total anthocyanins:** The total anthocyanin pigments were measured by the procedure of Fuleki and Francis (1968) with slight modification suggested by Khurdiya and Roy (1984). The volume of 0.2 ml of juice was made upto 10 ml with KC1-HC1 buffer (pH 1.00). For maximum development of colour, the solution was kept at room temperature for 2 hours in dark. The absorbance was measured at 510 nm in spectrophotometer. Results were expressed as mg anthocyanins per 100 ml of juice.

The experiment was conducted in completely Randomised Design with eight treatments. The treatments were replicated three times. The data were analysed as per the method of analysis of variance given by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

The data in respect of physico-chemical characteristics of *kokum*

fruit have been presented in Table 1. It was found that the average weight of *kokum* fruit was 22 g while average weights of seed and rind were found to be 12.3 g and 11 g, respectively. The average polar and equatorial diameters of the fruit were found to be 5.40 cm and 5.83 cm, respectively. The specific gravity of fruit was found to be 1.17.

The physico-chemical characteristics of *kokum* fruit juice extracted by various methods have been presented in Table 2. The juice yield of *kokum* fruit was found to be higher in hot method of extraction as compared to cold method of extraction. Among the various temperatures employed for heating the *kokum* crush, the temperature of 60°C was found to be the best as far as juice yield, total soluble solids and pigment extraction of *kokum* fruit was concerned. It was clear from the data that heating the *kokum* crush at 60°C yielded maximum juice recovery (76.66%), TSS (11.60%) and total anthocyanins (78mg/100 ml).

It was found that heating the *kokum* crush at 30, 40, 50, 60, 70, 80 and 90°C temperature gave 71.72, 72.24, 73.01, 76.66, 73.33, 70.00 and 63.00 per cent juice recovery and 10.7, 11.0, 11.2, 11.6, 11.8, 12.2 and 12.4 per cent total soluble solids respectively. It was interesting to note that the recovery of total anthocyanins content of *kokum* juice increased with

subsequent increase in temperature of heating of *kokum* crush upto 60°C. Similar observations were reported by Khurdiya and Roy (1984) in *jamun* fruit; Waskar and Khurdiya (1987) in *phalsa* and Deshmukh et al., 1993 in pomegranate fruit juice extraction. The recovery of juice and total anthocyanins content of *kokum* juice declined thereafter even if the temperature of heating of *kokum* crush was increased.

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Table 1. Physico-chemical characteristics of *kokum* fruit.

Sr. No.	Particulars	Observations
1.	Av. Weight of fruit	24 g
2.	Av. diameter of fruit	
	i) Polar	5.32 cm
	ii) Equitorial	5.89 cm
3.	Av. Weight of seed	12.9 g
4.	Av. Weight of rind	11.5 g
5.	Sp. gravity of fruit	1.18

Table 2. Physico-chemical characterisitics of *kokum* juice extracted by various methods.

Treat- ment (°c)	Juice yield	Pomace (%)	TSS (°B)	pH (%)	Acidity (%)	Anthocyanins (mg/100 ml)
Cold	70.00	26.48	10.0	2.13	3.53	53
30	71.12	25.12	10.7	2.15	3.76	58
40	72.24	24.10	11.0	2.19	3.97	57
50	73.01	24.00	11.2	2.17	4.03	68
60	76.66	23.48	11.6	2.16	4.33	78
70	73.33	23.92	11.8	2.14	5.04	59
80.	70.00	25.12	12.2	2.10	5.09	52
90	63.00	29.76	12.4	2.06	4.82	50
S.E. +	0.40	0.22	0.12	0.06	0.26	0.57
C.D at 5%	1.22	0.66	0.37	NS	0.78	1.73

DEVELOPMENT OF INSTANT VERMICELLI KHEER MIX

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ABSTRACT

A *kheer* mix has been developed based on reconditioned vermicelli, milk powder, sugar and flavourants. It is a nutritious low fat and energy rich food which provides 386 Kcal/100 g. Different brands of commercially available vermicelli have been screened for its suitability with respect to physical and chemical characteristics and their drying and rehydration aspects. The product has been found to have the required chemical and microbiological stability for 6 months at 37° C. In a sensory profile test using a trained panel, the product rated 7 on a 9 point hedonic scale. Similar observations were noticed when the product was subjected to limited user trials.

INTRODUCTION

Convenience foods popularly known as instant foods play a vital role in designing rations for Defence forces. Wheat and semolina based foods are currently used as a part of pack rations (Arya and Thakur, 1986, Premevally et al., 1987). High fat content foods are generally not suitable as high altitude rations (Hannon. et al., 1976). Keeping in view these problems, Vermicelli *Kheer* Mix has been developed. It is a dry mix made from reconditioned vermicelli (wheat), sugar, milk powder and flavourants. The product is wholesome, microbiologically safe and nutritious. The advantages of having quick rehydration, low in fat content and energy rich with long storage stability were the deciding factors in the development of instant vermicelli *kheer* mix. This paper presents the process standardisation of the product and data on chemical,

microbiological and sensory characteristics.

MATERIAL AND METHODS

Selection of proper brand of vermicelli for the preparation of vermicelli *kheer* mix: For assessing the suitability of proper brand, different commercially available brands of vermicelli have been purchased (Brand I, II and III) and their physical and chemical characteristics as well as drying and rehydration characteristics were studied.

Preparation of vermicelli: After the initial studies, the most appropriate brand of vermicelli was conditioned before mixing with other ingredients. First the vermicelli was fried at about 80-85°C until it becomes golden yellow. Then it is cooked in boiling water for about 5-8 minutes using a steam kettle (for 1 kg of vermicelli, 4 litres of water). After draining water, the cooked

vermicelli was spread into the trays and hot air dried at 60-65° C (Kilburn Dryer). It was dried to a final moisture content of 2-3%.

Commercially available skimmed milk powder was used for the preparation of vermicelli *kheer* mix. Cleaned, dried sugar was powdered in a Raymond mill and good quality slightly powdered cardamom and roasted cashew were used as other ingredients. All these ingredients were microbiologically tested before packing. Different combinations of these ingredients were tried and its rehydration and organoleptic characteristics were assessed for achieving a suitable combination of these ingredients. After testing different combinations, it was found that for one serving, 75g of vermicelli *kheer* mix is required. For this 75g, 20g vermicelli, 25g milk powder and 30g sugar powder were used. About 1g cashew and 0.5g cardamom

were also used as flavourants. For getting better consistency, about 2-3g of vermicelli powder was also added to the mix.

Packaging: 75g portions of vermicelli kheer mix were packed in a double packing system first in polypropylene (300 μ) and then in laminate (PFP) pouches of paper (45 GSM), Aluminium Foil (40 μ) and polythylene (37.5 μ). All samples were stored for various periods upto 12 months at room temperature (RT), 30°C \pm 2°C, 5° and at 37°C.

Rehydration : Different methods of rehydration procedures were tried like simmering, cooking in pack rehydration and microwave cooking. In all these methods different ratio of water were used and the rehydration quality was judged organoleptically.

Chemical analysis: The samples were analysed for moisture, protein, fat, ash and carbohydrate as per standard procedures (AOAC 1984, Ranganna, 1986). Browning index was measured using a Baush and Lomb Spectronic- 20 at 420nm.

Shelf life studies: Shelf life of stored samples was assessed by determining chemical, microbiological and organoleptic changes initially and then after 2 months, 6 months and 12 months, the stored samples were analysed for free fatty acids (Pearson 1968), peroxide value (AOAC 1984) and thiobarbituric acid content (Taraldgis et.al.1960)

Organoleptic analysis: All stored samples were subjected to sensory quality evaluation by a panel of 10 members for determining overall acceptability on a 9 point Hedonic Scale. The products receiving an overall score of 6 and above (9 for excellent) were considered acceptable.

Microbiological analysis: Samples were analysed for standard plate count (SPC), coliforms, faecal coliforms, yeast and mold using plate count agar, violet red bile agar, E.C. broth and potato dextrose agar respectively as per standard procedures (BAM 1992). Analysis was also carried out for *Salmonella*, *B. cereus* and *S. aureus*.

RESULTS AND DISCUSSION

The rehydration characteristics of different brands of vermicelli are shown in Table-I. Out of the three brands of vermicelli, brand-III rehydrated well with good consistency in all the three methods tried. In the case of brand -II, it required more water for rehydration and brand-I was macerated and pasty. Brand-III showed good rehydration characteristics in simmering (for 5-7 minutes), in pack rehydration (at 70-75°C for 10-15 minutes) and also microwave cooking.

The proximate composition of the three types of vermicelli is given in Table-II in the precooked form and after cooking and drying at 60-65°C. Diameterwise, both brand-II and

brand-III are same, but brand-I is thin. Proximate compositions of the three brands are almost similar except for the fact that protein and total ash are slightly higher in the case of brand-III. Leaching losses were also minimum in brand-III. Therefore, for the preparation of vermicelli kheer mix, brand-III was used.

Table-III shows the proximate composition of vermicelli kheer mix. Because of the low fat content, it is a very good food product for several Army expeditions, Army messes and other large catering establishments. Since its protein percentage is 24%, it contributes very well towards the maintenance level of protein of 0.8-1.0g/kg body weight as recommended by ICMR 1993. Its higher carbohydrate content of nearly 70% (on dry weight basis) provides the bulk of the energy contributed by this food, the total energy calculated being 386 Kcal/100g. This is an additional desirable feature of foods for high altitudes, the energy from fat being far less than that from the carbohydrate component (Hannon JP et.al., 1976).

Table-IV shows the rehydration characteristics of the product with varying amounts of water and by using different methods. Out of the different ratios of water used, 1:2 ratio and simmering for 5-7 minutes seemed to have good rehydration characteristics. In the case of microwave cooking, the milk comes

out of the beaker and because of that vermicelli was not getting properly cooked. Inpack rehydration at 70-75° C for 10-15 min. is also good, but softening of vermicelli was better in the other method.

Microbiologic quality: Table-IV shows the microbiological status of the product. Samples had only a few thousands of SPC. Neither coliforms and faecal coliforms nor pathogens like *Salmonella*, *B. cereus* and *S. aureus* were detected. Yeasts and molds were in the range of 10-15/g. These numbers are well within the limits prescribed for similar foods by NASA(1985).

Storage stability: Table VI gives the chemical stability of the product stored at different temperatures. This was evaluated by determining the changes in FFA, PV, TBA and sensory scores. At RT and 37°C, a slight increase in FFA, PV and TBA was detected in 2-12 months. The increase in PV and TBA was more pronounced at 37° C though there was no detectable off-odours. There are no definite and generalised cut off values for any of these parameters corresponding with acceptance or rejection of a product. They vary with the product and packaging film used. As already mentioned, this product does not contain high amount of fat and the rate of oxidation is lowest. On these considerations, vermicelli *kheer* mix can be said to possess good chemical stability during the observed storage period.

During storage there was a reduction of 1 log number in 2 months at all the three temperatures. Since there was no reduction in numbers after 3 months, the organisms could be mesophilic, spore formers other than *B. cereus*.

Organoleptic evaluation: The effect of storage on the overall acceptability of vermicelli *kheer* mix is shown in Table-VII. On the sensory level, none of the samples at different temperatures was found to have developed any detectable off-odours or flavours during the observation period. The data indicate that at no time did the scores fall below 6 showing that the food is acceptable in terms of flavour, taste and rehydratability. The eating characteristics of the food remained unaffected for 1 year despite the apparent increase in the FFA, PV and TBA values.

CONCLUSION

The studies revealed the importance of selection of a proper variety and conditioning of the vermicelli to get a product of good rehydration characteristics. Chemical, microbiological and organoleptic evaluation of the product reveals very good storage stability. It is a wholesome, microbiologically safe, nutritious, energy rich product, suitable for all ages, particularly for hospital patients, school children and special feeding in disaster relief operations, expeditions and mountaineering.

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Table 1 - Rehydration Characteristics

Vermicelli type	Simmering 5-7 min.	Inpack 70-75° C in polypropylene 10-15 min.	Mircowave cooking
Brand I	1:2, cooked well, slightly pasty, macerated.	Rehydrated well, slight pasty look observed.	80° C for 5 min, macerated fully. Pasty homogeneous mass (10 g/20 ml)
Brand II	Requires more water for rehydration (1:2.5)	(1:2.5). Rehydration satisfactory. vermicelli not sofetned fully.	80°C for 5 min(10g/40 ml) Cooked well, flowing consistency.
Brand III	1:2, Vermicelli softened. Rehydration satisfactory. Flowing consistency.	1:2, rehydrated well. Vermicelli uniformly distributed in a homogeneous mass.	80°C for 5 min. (10g/30 ml). Rehydration very good.

Table II- Characteristics of different brands of vermicelli

Parameters	Vermicelli type		
	Brand I	Brand II	Brand III
Diameter (mm)	0.6	1.0	1.00
<u>Proximate composition</u>			
Moisture, %	4.03 \pm 0.05	3.87 \pm 0.14	3.21 \pm 0.11
Protein, %	6.07 \pm 0.14	7.06 \pm 0.24	8.33 \pm 0.08
Fat, %	0.26 \pm 0.02	0.20 \pm 0.01	0.30 \pm 0.01
Carbohydrate, %	87.25 \pm 0.63	87.02 \pm 0.40	85.41 \pm 0.61
Total Ash, %	2.3 \pm 0.12	1.9 \pm 0.10	2.8 \pm 0.12
<u>Preconditioning - cooked and dried at 60-65°C</u>			
Diameter (mm)	0.4	0.9	0.9
Moisture, %	3.9 \pm 0.06	3.8 \pm 0.31	3.10 \pm 0.12
Protein, %	4.8 \pm 0.15	6.9 \pm 0.23	7.5 \pm 0.49
Fat, %	0.21 \pm 0.02	0.20 \pm 0.01	0.25 \pm 0.03
Carbohydrate, %	88.59 \pm 0.79	87.00 \pm 0.98	86.65 \pm 0.40
Total Ash, %	2.5 \pm 0.10	2.1 \pm 0.20	2.6 \pm 0.10

Table III- Proximate Composition of Composite Vermicelli
Kheer Mix (g/100g)

Moisture	-	2.35 ± 0.11
Fat	-	1.5 ± 0.13
Protein	-	24.0 ± 0.71
Total Sugar	-	69.15 ± 0.71
Total Ash	-	3.0 ± 0.21
Calories	-	386 Kcal

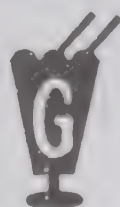
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Table IV- Rehydration Characteristics-Vermicelli Kheer Mix

Ratio of water used.	Simmering 5-7 min.	Cooked for 5-7 min.	Inpack 70-75°C 10-15 min.	Microwave
1.1	Vermicelli cooked, slight charring noticed, overall rehydration incomplete.	Hardened mass, Charring noticed.	Vermicelli not cooked incomplete rehydration	Milk comes out of the beaker vermicelli is not getting cooked, not feasible.
1.2	Vermicelli softened Rehydrated, flowing consistency, vermicelli uniformly distributed in a homogeneous.	Vermicelli seen as individual pieces gradually thickness.	Rehydrated vermicelli fully softened.	-do-
1.3	Vermicelli cooked and macerated homogeneous, watery in appearance	Vermicelli settles at the bottom. Liquid portion separates.	Watery in appearance, not a homogeneous mixture.	-do-

Table V - Microbial profile (Nos g⁻¹) vermicelli *kheer* mix stored at different temperatures

Period of storage (months)	5° C			RT			37° C		
	SPC	Coliforms	<i>E. Coli</i>	Y & M	SPC	Coliforms	<i>E. Coli</i>	Y & M	SPC
Initial	6.6.X 10 ³	Nil	Nil	10	6.6.X 10 ³	Nil	Nil	10	6.6.X 10 ³
Two Months	5.0 X 10 ²	Nil	Nil	9	3.5 X 10 ²	Nil	Nil	15	5.1 X 10 ²
6 months	3.0 X 10 ²	Nil	Nil	10	4.9 X 10 ²	Nil	Nil	10	8.8 X 10 ²
12 months	1 X 10 ²	Nil	Nil	5	4 X 10 ²	Nil	Nil	10	5 X 10 ²

Table-VI : Storage behaviour of Vermicelly *Kheer* Mix at RT, 5°C and 37°C

	RT MONTHS				5°C MONTHS			37°C MONTHS		
	0	2	6	12	2	6	12	2	6	12
Moisture (g/100g)	2.35 + - 0.10	2.50 + - 0.14	2.30 + - 0.08	2.14 + - 0.09	2.38 + - 0.07	2.35 + - 0.04	2.59 + - 0.03	2.00 + - 0.06	2.40 + - 0.06	2.10 + - 0.02
Peroxide value (m.e.O ₂ /kg)	2.30 + - 0.07	2.96 + - 0.02	5.15 + - 0.16	7.50 + - 0.16	2.50 + - 0.09	3.50 + - 0.09	5.15 + - 0.09	3.50 + - 0.08	6.80 + - 0.09	10.90 + - 0.19
TBA (mg/kg sample)	0.18 + - 0.02	0.18 + - 0.02	0.36 + - 0.03	0.54 + - 0.03	0.18 + - 0.02	0.24 + - 0.02	0.36 + - 0.04	0.36 + - 0.04	0.54 + - 0.06	0.78 + - 0.06
FFA, % as oleic acid	0.28 + - 0.03	0.36 + - 0.02	0.42 + - 0.02	0.59 + - 0.03	0.28 + - 0.02	0.36 + - 0.08	0.40 + - 0.06	0.04 + - 0.05	0.59 + - 0.03	0.72 + - 0.08
Browning Index	0.04 + - 0.01	0.04 + - 0.01	0.05 + - 0.02	0.08 + - 0.02	0.04 + - 0.01	0.05 + - 0.02	0.05 + - 0.02	0.06 + - 0.02	0.07 + - 0.03	0.09 + - 0.03

Table-VII : Sensory scores of vermicelli *kheer* mix stored at different temperatures

Period of storage in months	RT				5°C				37°C			
	Flavour	Taste	Rehydra- tability	Overall accepta- bility	Flavour	Taste	Rehydra- tability	Overall accepta- bility	Flavour	Taste	Rehydra- tability	Overall accepta- bility
0	8.1 ±	8.6 ±	8.0 ±	8.7 ±	8.1 ±	8.6 ±	8.0 ±	8.7 ±	8.1 ±	8.6 ±	8.0 ±	8.7 ±
	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.2
2	7.9 ±	8.2 ±	7.5 ±	8.4 ±	8.1 ±	8.2 ±	7.6 ±	8.6 ±	7.4 ±	7.9 ±	7.4 ±	8.0 ±
	0.1	0.2	1.0	0.1	0.2	0.2	0.5	0.2	0.5	0.6	0.5	0.2
6	7.4 ±	7.2 ±	7.2 ±	7.9 ±	7.2 ±	7.9 ±	7.2 ±	8.0 ±	7.0 ±	7.0 ±	7.0 ±	7.1 ±
	0.7	0.5	0.5	0.6	0.4	0.6	0.5	0.2	0.6	0.5	0.7	0.9
12	7.0 ±	7.2 ±	7.0 ±	7.2 ±	7.2 ±	7.5 ±	7.0 ±	7.2 ±	6.8 ±	6.8 ±	6.9 ±	6.8 ±
	0.6	0.5	0.5	0.5	0.5	0.2	0.5	0.9	0.8	0.9	0.6	0.8

EFFECT OF DIFFUSION BARRIERS ON JUICE QUALITY OF STORED KINNOW FRUIT

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ABSTRACT

Two types of edible coatings, cellulose based-carboxy methyl cellulose (0.5%, 1.0% and 1.5%) and protein based-casein alkali soluble (8%) in combination with packaging materials like, low density and high density polyethylene bags (200 gauge) were tried as diffusion barrier films for extending the shelf-life of kinnow fruits under ambient conditions (temperature and relative humidity varied between 18-28° C and 55-65 percent, respectively during the period of experiment). The quality of the stored fruit was evaluated on the basis of chemical characteristics like juice recovery, acidity, total soluble solids and TSS-Acid ratio. The carboxy methyl cellulose (0.5%) coating and high density polyethylene bags were found to be the most suitable combination for extending the shelf life of kinnow upto 40 days without adversely affecting the juice quality.

INTRODUCTION

Citrus is one of the most important tropical fruits in the world with total production of 93.52 million tonnes in the year 1998 out of which Asia contributes 29.4 percent. (Anonymous, 1998). Among the citrus fruits, kinnow (a hybrid of King x Willow leaf mandarins) has been identified for successful cultivation of excellent quality fruit (Bhullar, 1978). Attempts have been made to keep the surplus fruits in cold storage, but due to the problem of chilling injury from low temperature storage and absence of refrigerated marketing facilities, the cold storage of kinnow has not been commercialized by the trade. Kinnow, being a tropical fruit is injured below 6° C as most of the cold storage facilities have been

created for potato (0°C) and special chambers for kinnow and other tropical fruits are almost nonexistent (Sidhu, 1993). Alternatively, processing of the surplus fruit cannot be realized because its juice develops bitterness during processing and the technology for processing is still imperfect and costly. This necessitates the storage of this fruit for juice purpose by using effective and inexpensive storage technique.

Various types of diffusion barriers such as edible coatings, polyethylene bags, etc. have been used by researchers in order to enhance the shelf-life of fruits and vegetables (Morales and Lomeline, 1974; Andres, 1984; Nisperos et al. 1991; Park et al; 1994). Such studies were lacking for kinnow fruits; thus, the

present investigation was undertaken to assess the effects of diffusion barriers on the juice quality of stored kinnow (Alam, 1998).

MATERIALS AND METHODS

The laboratory study was carried out under ambient conditions: 18 to 28° C temperature and 55 to 65 percent relative humidity. The freshly harvested fruits were procured from one of the important farms in Punjab, sorted for uniform size, colour and physical damage, washed with chlorine water (0.05% bleaching powder) and then wiped with a muslin cloth. Lots were divided into two groups- coated and un-coated. The coatings selected were carboxy methyl cellulose (CMC) - a cellulose based coating (0.5, 1.0 and 1.5%); and casein - a

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protein based coating (8%). The coatings were applied by dipping method. The carboxy methyl cellulose formulation was prepared by mixing 40 g of carboxy methylcellulose powder in 2 litres of distilled water in a large blender. Mixture was blended for 10 min. at 12,000 rpm and held for 1 hr. Other ingredients added in coating formulations were - Glycerol, a plasticizer, in the ratio of 1:9 (w/w) of the weight of coating and 0.2% of calcium chloride and mixed slowly for 1 min. and held for 1 hr prior to use (Charles et al., 1989; Alam, 1998). Final dilutions were prepared by diluting this 2% CMC solution in distilled water to a desired concentration of 0.5, 1.0 and 1.5%, while the casein alkali soluble (CAS) formulation of 8% (w/w) was prepared as per the procedure standardized by other researchers (Habig Mchugh et al., 1993; Avena-Bustillos and Krochta, 1993). To stabilize the protein coating (CAS) formed on the outer skin of the fruit, it was further treated with sodium acetate buffer of pH (4.6) (Avena-Bustillos and Krochta, 1993; Alam, 1998). The chlorine washed fruits were immersed for 2 minutes in the coating formulation and were air-dried with a fan. The treated fruits were kept overnight to achieve uniform distribution of the coating except the casein coated fruits which were again cross-linked with the sodium acetate buffer after the first drying, and subsequently dried in the air as before (Alam, 1998). The fruits were then packed in two types of packaging (200 gauge) - low

density polyethylene (LDPE) bags and high density polyethylene (HDPE) bags. The bags were closed with an electric sealer and kept in a well ventilated room. A set of un-coated samples were also kept in open trays (control). Each sample contained 3 fruits and each treatment was replicated thrice. The samples were removed after 10, 20, 30, 40 and 45 days of storage and were analysed for juice quality. The juice quality of the stored fruits was assessed on the basis of juice recovery, total soluble solids, acidity and TSS-Acidity ratio. The data were statistically analysed using factorial experiment in Completely Randomized Design (CRD). The Least Significant Difference (LSD) was calculated at five percent level of significance ($P = 0.05$).

RESULTS AND DISCUSSION

Juice Content : It can be seen from Fig. 1a that the juice content increased upto 20 days of storage, followed by gradual decrease in case of un-coated (control) and 0.5 per cent CMC coated fruits kept in open tray, while for all other coating treatments there was an initial increase followed by continuous decrease in juice content throughout the storage period. The initial increase may be due to the fact the initial loss of moisture was from the peel only whereas the juice was measured from the pulp (El-Zeftawi, 1976). The significant decrease in juice percentage after prolonged storage was probably due to the

continuous dehydration of peel (Das and Dash, 1967).

In case of both LDPE and HDPE sealed fruits, the juice content decreased upto 20 days, thereafter it increased and then again decreased. However, HDPE packed fruits maintained a steady level of juice content compared to LDPE bags (Fig 1b and 1c). The statistically analysed data showed that the CMC coating maintained almost uniform juice content irrespective of the concentration of the coatings, while amongst packaging material, the juice was best retained in trays (Table 1).

Total soluble solids : The results (Fig. 2) show that the TSS increased throughout the storage period in control fruits kept in open tray as well as sealed in HDPE while TSS decreased in LDPE sealed fruits throughout the storage period. The increase in TSS may be due to the hydrolysis of the polysaccharides and concentration of the juice as a result of dehydration (Das and Dash, 1967), while the decrease in TSS, in case of LDPE sealed fruits, throughout storage period may be attributed to the decrease in non-functioning of hydrolysing enzyme (due to lower gas transmission rate of LDPE, compared to HDPE film) which are responsible for the breakdown of polysaccharides into simple sugars. It is clear from Table 1 that the coatings, packaging material, storage period and their interaction significantly affected TSS. It was maximum in 0.5 percent

CMC coated fruits and was best retained in polyethylene bags, irrespective of its type. The juice quality started deteriorating after 30 days of storage of the fruit and the fruits having TSS below 10.0° Brix produced off-flavour. This may be due to the conversion of sugar into alcohol.

Acidity : It is clear from Fig. 3 that the acidity decreased throughout the storage period, irrespective of packaging material in un-coated fruits. This decrease in acidity may be due to the utilization of organic acids in respiratory process. In general, HDPE packed fruits retained higher acidity level than LDPE packed fruits irrespective of coatings. The high acid content (0.875% and 0.661%) was found in HDPE sealed 0.5 percent CMC coated fruits after 30 and 45 days of storage respectively. This was due to the availability of less oxygen; hence the organic acids were not oxidized and the acidity level remained high (Josani et al., 1983). The coatings, packaging material, storage period and their interactions had significant effect on acidity while the combined effect of packaging material and storage period was found nonsignificant (Table 1). The quality of the juice as regards acidity, could be retained well upto 30 days of storage and thereafter, it deteriorated (Alam, 1998).

TSS-Acid Ratio : It was found that the control fruits showed steady increase in TSS-Acid ratio, irrespective of packaging material,

which might be effect of the increased respiration rate. In general, no definite pattern was observed in case of TSS-Acid ratio when fruits were coated and sealed in polyethylene bags, but fruits sealed in HDPE showed better retention of TSS-Acid ratio because of smaller variation (3.39, 2.76, 2.72 and 1.55) than the fruits stored in LDPE bags (4.4, 7.15, 6.72 and 3.42) when coated with 0.5 per cent CMC, 1.0 percent CMC, 1.5 percent CMC and 8.0 percent casein, respectively throughout the period of storage (Fig. 4).

Further, it is also clear that the coatings, packaging material, storage period and their inter-actions significantly affected the TSS-Acid ratio (Table 1). The TSS-Acid ratio was best retained in 0.5 percent CMC coated fruits packed in HDPE bags when compared with its initial value. The quality of fruits deteriorated because of disturbed TSS-Acid ratio resulting in off-flavour which may be due to senescence when the fruits continue to respire (Dhatt et al., 1991).

CONCLUSION

As a packaging material, high density polyethylene bags were superior to low density polyethylene bags and open tray. Under ambient conditions, the CMC (0.5%) coating and high density polyethylene bags were found to be the most suitable combination for extending the shelf life of kinnow fruit for juice

purposes upto 40 days without adversely affecting the juice quality.

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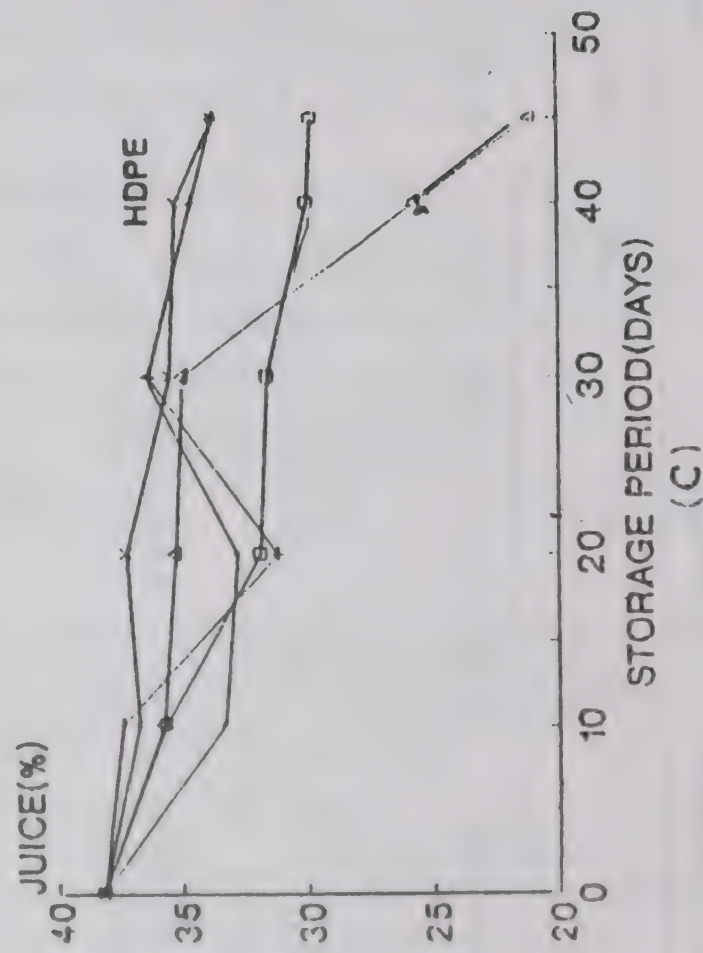
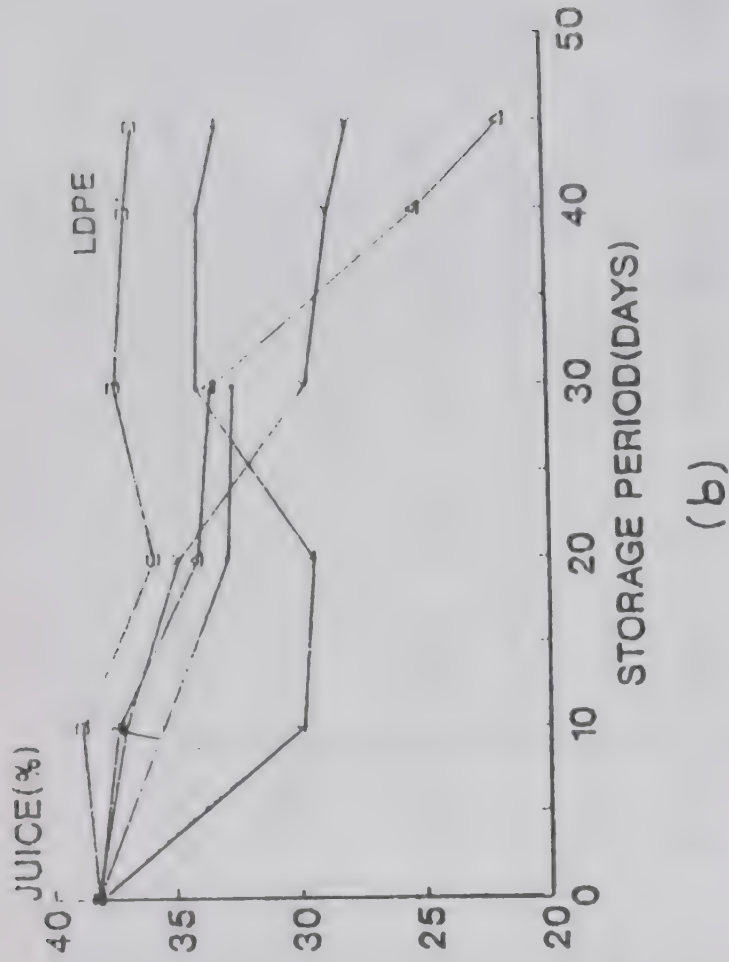
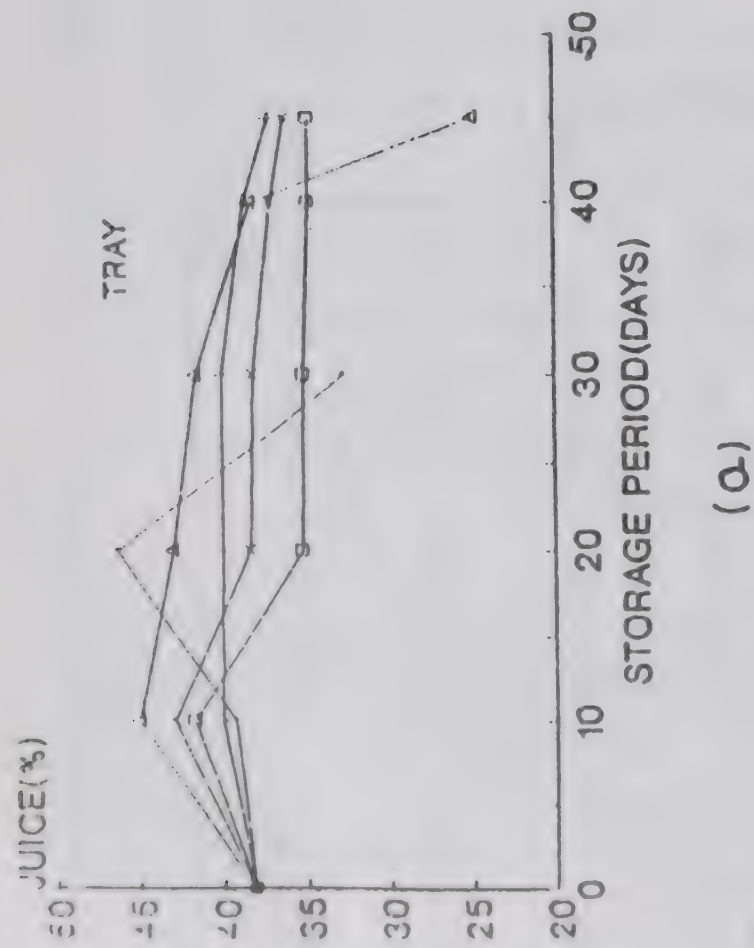
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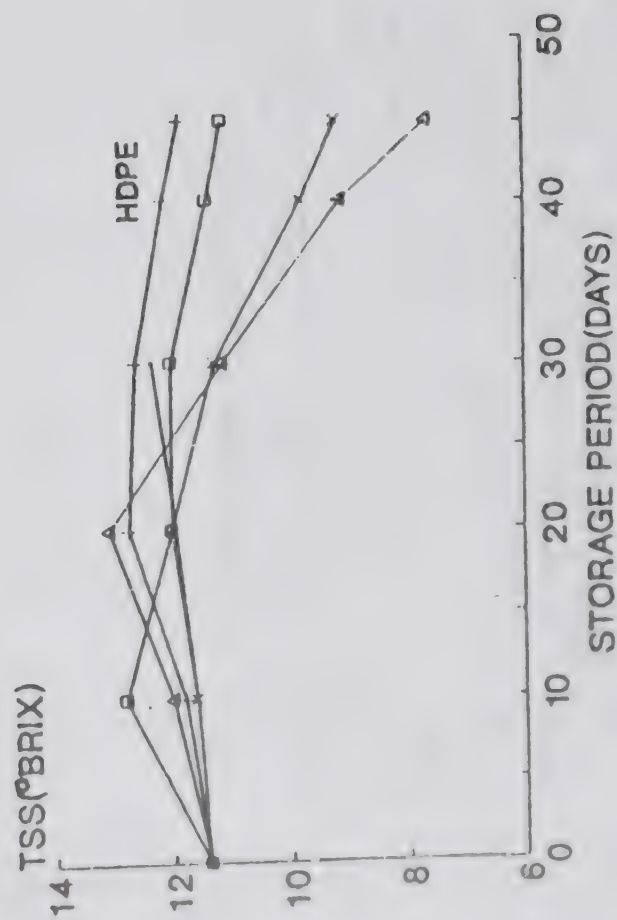
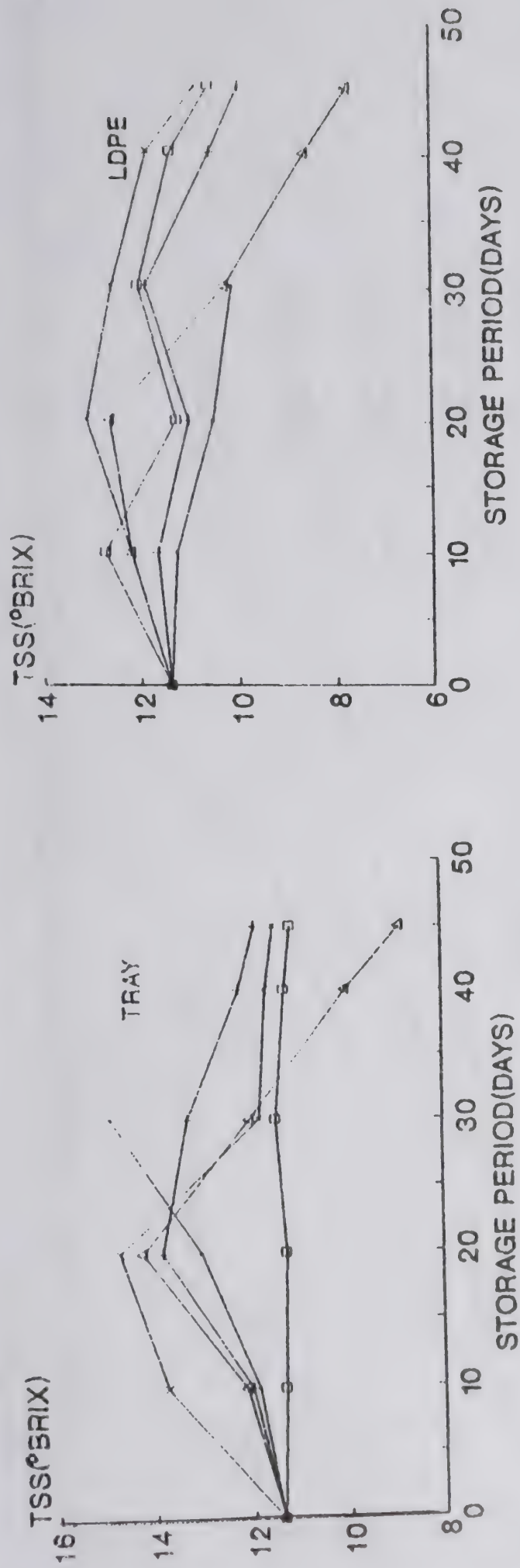
Table 1. Treatment effects on different quality parameters.

Quality parameter	Coatings (A)			Packaging (B)			Storage period (C)					
	CMC (0.5%) (1.0%) (1.5%) (8.0%)	Casein (8.0%)		Tray	LDPE	HDPE	0	10	20	30	40	45
Juice content (%)	35.80	35.57	35.76	33.90	38.16	33.67	38.16	38.22	35.53	35.67	33.24	30.85
LSD (p=.05)	0.89 (A) (AxB : 1.54) ; (AxC : 2.18)			0.77(B) (BxC : 1.88) ; (AxBxC : 3.77)			1.09 (C)					
Total Soluble solids (Brix)	11.85	11.56	11.76	10.71	11.92	11.36	11.36	11.40	12.20	12.63	12.04	10.84
LSD (p=.05)	0.26(A) (AxB : 0.45) ; (AxC : 0.65)			0.23(B) (BxC : 0.55) ; (AxBxC : 1.12)			0.32(C)					
Acidity (%)	0.781	0.751	0.767	0.650	0.760	0.729	0.714	0.819	0.828	0.699	0.60	0.561
LSD (p=.05)	0.033(A) (AxB : 0.057) ; (AxC : 0.08)			0.028(B) (BxC : NS) ; (AxBxC : 0.14)			0.04(C)					
TSS/Acid ratio	15.36	15.82	16.09	17.11	16.0	16.72	15.57	15.25	15.68	17.07	18.07	18.09
LSD (p=.05)	1.2E-6(A) (AxB : 2.0E-6) ; (AxC : 2.9E-6)			1.0E-6(B) (BxC : 2.5E-6) ; (AxBxC : 5.0E-6)			1.4E-6(C)					



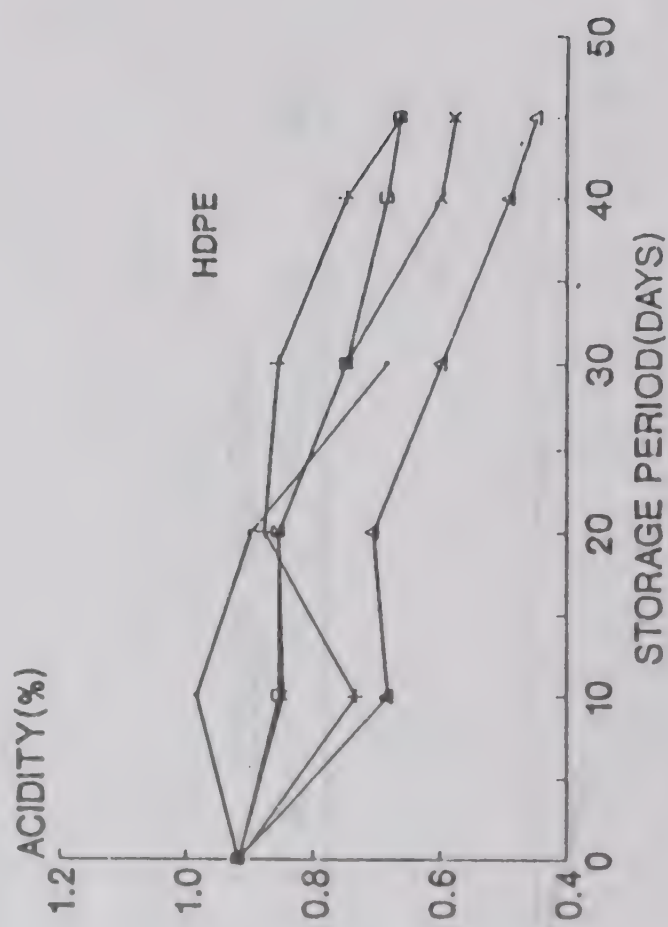
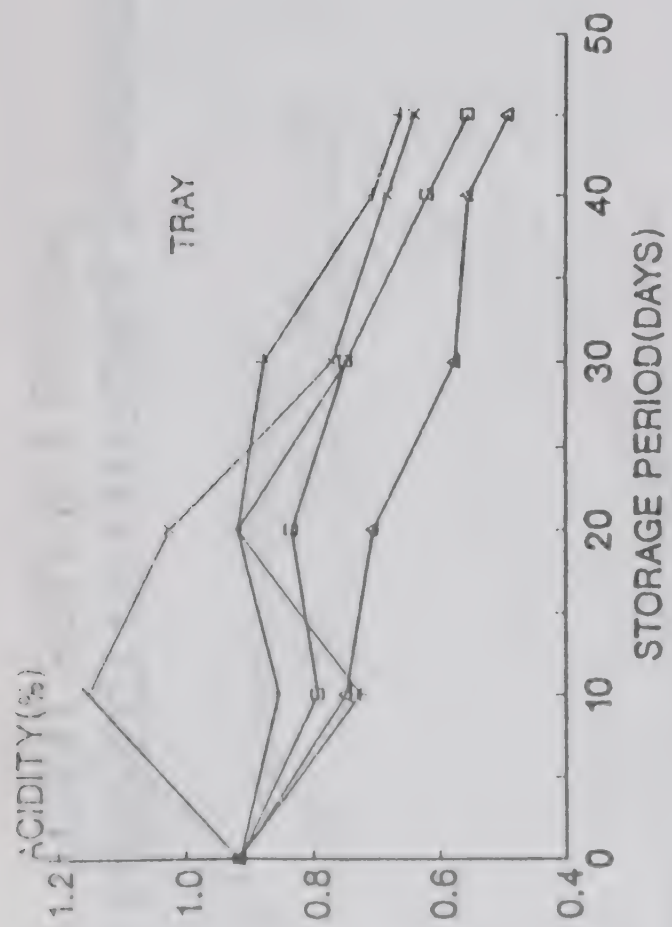
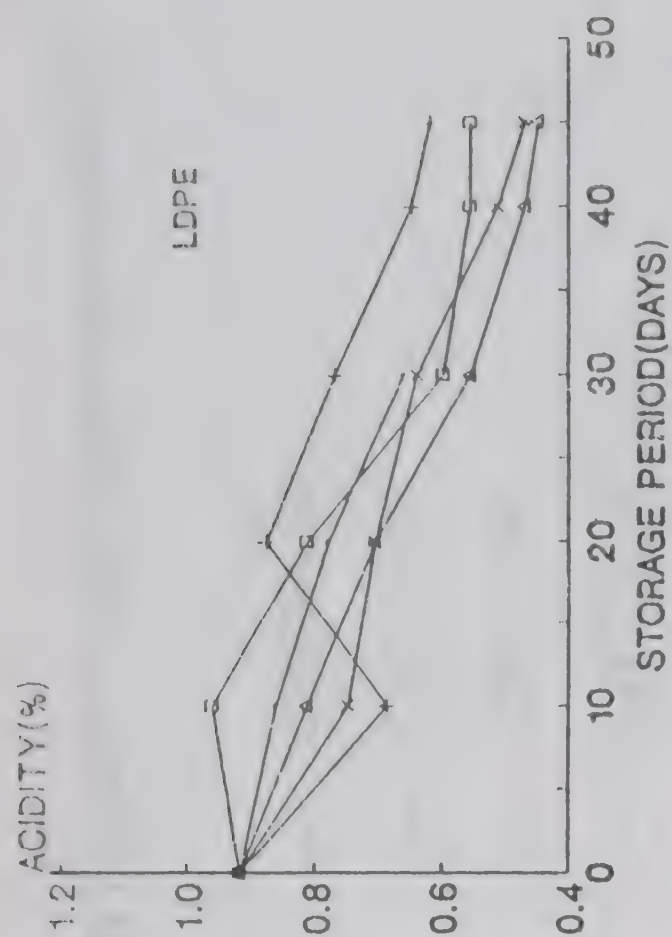
- CONTROL
- CMC 0.5%
- CMC 1.0%
- CMC 1.5%
- CASEIN 8% ■

FIG.1. EFFECT OF COATINGS, PACKAGING MATERIAL AND STORAGE PERIOD ON JUICE YIELD(%)



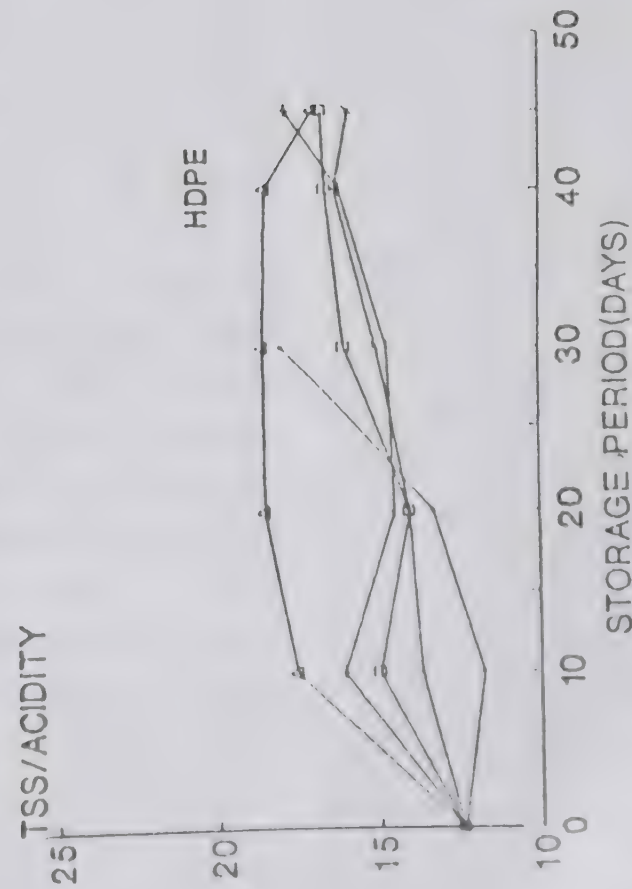
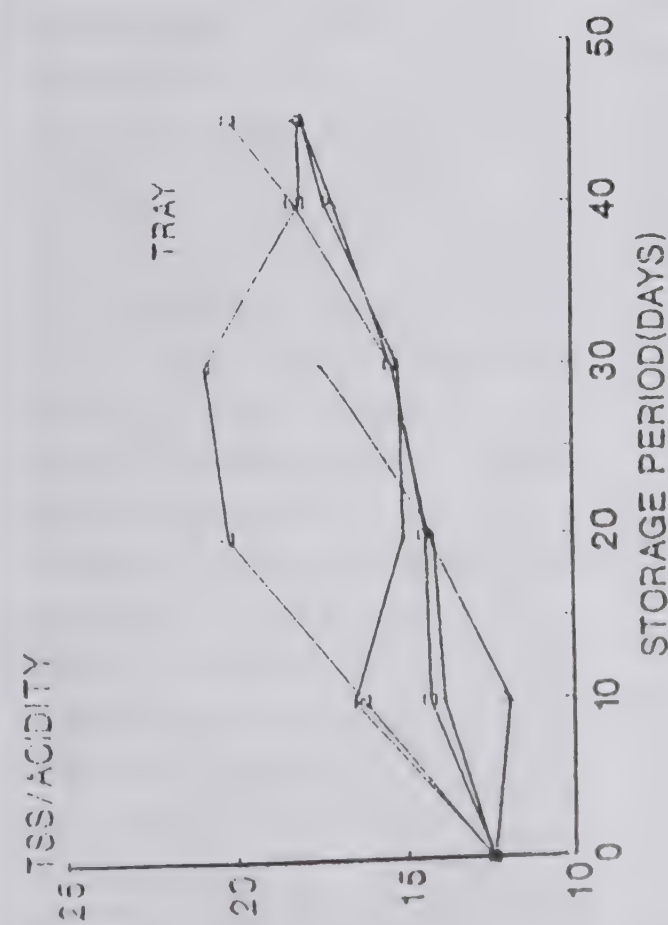
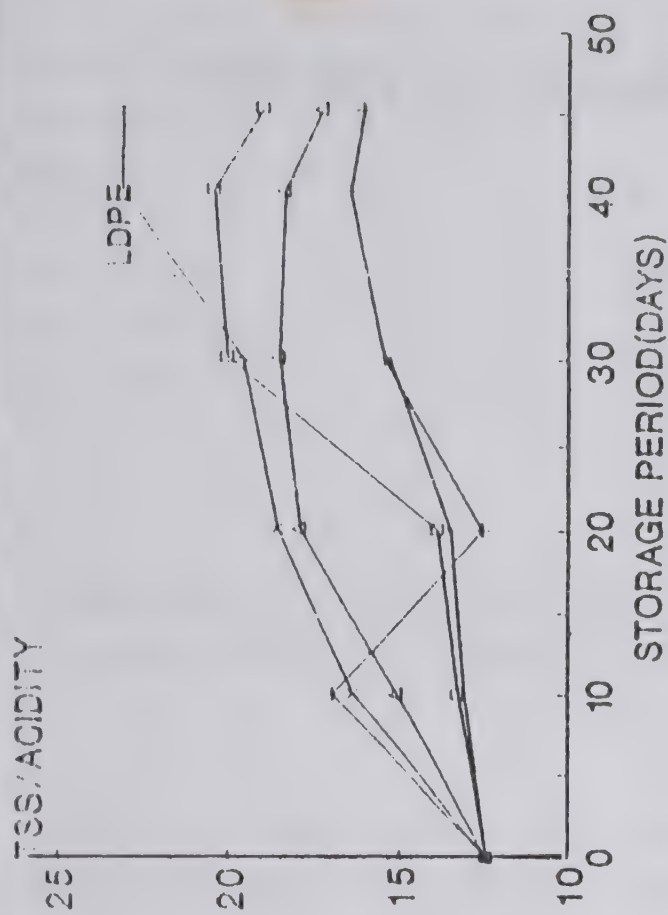
— CONTROL
 —+— CMC 0.5%
 —□— CMC 1.0%
 —×— CMC 1.5%
 —△— CASEIN 8%

FIG. 2. EFFECT OF COATINGS, PACKAGING MATERIAL AND STORAGE PERIOD ON TOTAL SOLUBLE SOLIDS



— CONTROL
 —+— CMC 0.5%
 —□— CMC 1.0%
 —x— CMC 1.5%
 —△— CASEIN 8%

FIG. 3. EFFECT OF COATINGS, PACKAGING MATERIAL AND STORAGE PERIOD ON ACIDITY



- CONTROL
- CMC 0.5%
- CMC 1.0%
- CMC 1.5%
- CASEIN 8%

FIG. 4. EFFECT OF COATINGS, PACKAGING MATERIAL AND STORAGE PERIOD ON TSS-ACID RATIO

REVIEW ARTICLES

ZERO ENERGY COOL CHAMBER STORAGE OF FRUITS - A REVIEW

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ABSTRACT

Zero energy cool chamber technology has been identified as a low cost storage technique which helps to preserve the freshness of the fruits and vegetables. The work done on the cool chamber storage of different fruits have been presented here.

INTRODUCTION

The shelf life of horticulture produce is dependent upon variety, preharvest crop management and maturity at harvest etc. Although, India's contribution to the world's fruit production is significant, a huge quantity of fruits are wasted primarily due to lack of proper on-farm storage facilities. The ancient Egyptians used a primitive form of evaporative cooling dating back to 2500 B.C. and so did Moghals for better living during hot summer. Water during the process of evaporation takes the heat from its surrounding to effect cooling. Evaporative cooling consists of a wet porous bed through which air is drawn, cooled and humidified by evaporation of water (Roy and Khurdia, 1986).

The on-farm, low cost, zero energy cooling chamber with small capacity has been developed by using locally available materials. The double walled chamber constructed of bricks, sand and bamboo is kept soaked with water. The evaporative cooling effect reduces the inside temperature by as much as 17-18°C and keeps the relative humidity above 90% during peak summer. It has been found that this chamber can also maintain temperature at 8-12°C lower than the ambient temperature with relative humidity of around 90%. A large number of fresh fruits and vegetables and their products have been used for evaluating their storage performance in this chamber. The zero energy cooling chamber works on the principle of evaporative cooling

(Roy and Pal, 1994). The review of literature pertaining to the cool chamber storage of different fruits have been presented as under.

Gupta (1985) observed that *Gola*, *Kaithali* and *Umran* varieties of *ber* could be stored for 18, 14 and 15 days, respectively under evaporative cool storage conditions. Singh (1987) reported use of zero energy cool chamber for increasing the storage life of *ber* fruit cv. *Gola*. The fruits kept in zero energy cool chamber proved better in quality as well as in biochemical and physiological factors as compared to the fruits kept at room temperature. Antarkar (1986) reported that the cool chamber was found to increase the shelf life of cashew apples and reduced the physiological loss in weight appreciably as compared to room

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temperature. Similar findings were also reported by Pawar (1988) in *Karonda* fruits.

Aror and Narsimhan (1988) reported that the Coorg Mandarin could be stored for 20 days under evaporative cool storage conditions (22 to 24°C temperature and 90 \pm 5% RH) when treated with 6 per cent fungicidal wax (having 1000 ppm Bavistin) as against a storage life of 5 days for untreated fruits stored at ambient conditions (21-28°C temperature and 30-80% RH). The evaporative cooling storage gave six times longer storage life for apples and four times longer life for mandarins than at ambient conditions. Waskar (1989) from his studies on storage and ripening of banana, observed that banana fruit cv. *Basrai* could be stored in cool chamber upto 20 days as against 14 days at room temperature.

Sharma et al. (1990) reported increased shelf life and less decay and minimum loss in weight in case of Kinnow mandarin fruit in zero energy cool chamber when packed in wooden boxes and 100 gauge polyethylene bag. Garande (1992) reported that the storage life of *Jamu* fruit could be extended upto seven days in cool chamber (24.4 to 26°C temperature and 95% RH) as compared to two days at room temperature. The data on physico-chemical parameters indicated that cool chamber is better for storage of *Jamun* as compared to room temperature.

Reddy and Nagaraju (1993) reported increased shelf life of sapota fruit cv. Kalipatti when stored in evaporative cool chamber. The cool chamber storage significantly reduced physiological loss in weight and shrivelling. Higher firmness due to delay in ripening and a delay in increase of TSS, reducing the total sugars, decrease in acidity and less rotting of fruit was observed leading to recovery of higher per cent of marketable fruits. Chattopadhyay et al. (1994) reported storage life of 29 and 20 days for sapota fruits treated with GA3 (100 ppm) and Bavistin (500 ppm), respectively when fruits were stored in cool chamber.

Joshi et al. (1993) reported that cool chamber was found to increase the shelf life of fruits like mango (cvs. *Alphonso*, *Pairi*, *Kesar*, *Ratna*) sapota, banana, seedless lemon, kokum (raw and ripe) and *karonda*. Kumar and Nath (1993) reported that the physiological loss is weight, decay and loss of vitamin C content were considerably less in *aonla* stored in zero energy cool chamber as compared to those stored at room temperature. In cool chamber, the fruits of *aonla* cv. *Chakaiya* could be stored upto 12 days as against 4 days at room temperature.

Thankaraj and Irulappan (1993) studied the effects of cool chamber storage with pre-packaging on shelf life of *Neelum* mango and reported that in the cool chamber, the development of colour was observed in 8-9 days and the fruit

was ripe in 12-14 days as against 4 and 7 days in control. The treatments registered a phenomenal reduction in physiological loss in weight (PLW). It ranged from 0-7 per cent in the treatments as compared to 10-14 in the control. Baviskar et al. (1995) reported that various postharvest treatments such as polyethylene packaging, CFB packing and wax coating when in combination had a great significance in retaining the physico-chemical characteristics and reducing the wastage of *ber* fruits. The shelf life of *ber* fruits could be extended upto 15 days with wax treatment coupled with polyethylene and CFB packing during storage in cool chamber.

Nikam and Waskar (1995) reported that the shelf life of sapota fruit when packed in polyethylene bag (200 gauge and 1.2% vents) + CFB boxes and in polyethylene bag (100 gauge and 1.2% vents) could be extended upto 13 and 15 days, respectively when stored in cool chamber. Narayan et al. (1996) reported that shelf life of ripe mango fruits cv. *Baneshan* could be increased upto 12 days in zero energy cool chamber (23 \pm 3°C temperature and 85 to 90% RH) as against 8 days at room temperature (29.11°C to 33.81°C temperature and 56 to 66% RH) when fruits were treated with 500 ppm Bavistin and sealing the stem end with molten parafin wax. Pal et al. (1997) studied the storage performance of Kinnow mandarin in evaporative cool

chamber and reported that the Kinnow fruits treated with Bavistin in combination with Semparfresh sucrose polyester wax (1.5%) could be kept upto 40 days in cool chamber (14.50 to 18.69°C temperature and 84 to 90% RH) as against 15 days at room temperature (16.75 to 20.61°C temperature and 62 to 95% RH).

Waskar et al. (1997) reported that Waxmul (6%) and Bavistin (0.1%) dip with polyethylene packaging extended the shelf life of sweet orange upto 60 days in cool chamber (19.86 to 22.30°C temperature and 94.58 to 95.2% RH) and 55 days at ambient conditions as against 17 days in control. The physiological loss in weight (PLW) of sweet orange fruits was hardly 2.50% when stored in cool chamber as against 33.79% at an ambient conditions. The cool chamber stored fruits looked fresh, firm, green and attractive even at the end of storage period of 60 days. The fruits stored at ambient conditions were found to have been infected with stem end rot.

Waskar et al. (1997) studied the influence of postharvest fungicidal application and packaging materials on storability of sweet orange at various environments and reported that, the postharvest fungicidal application of Bavistin (0.1%) with polyethylene packaging (150 gauge and 0.3 per cent vents) extended the shelf life of sweet orange upto 47 days when stored in cool chamber (18.38 to 22.43°C

temperature and 92 to 94% RH) as against 20 days in control at room temperature storage. Moreover, the cool chamber has added advantage of easy construction and simple operation.

Waskar et al. (1998) reported that pomegranate fruits treated with wax coupled with carbendazium (0.1%) could be extended upto 48 days in cool chamber as against 15 days at room temperature. Data on shelf life, physiological loss in weight (PLW), juice content, acidity and TSS indicate that the cool chamber is an ideal on-farm storage technology for maintaining proper quality and market acceptability of pomegranate.

CONCLUSION

As seen in the review, continuous research from 1986-1998 (for 12 years) has been carried out on the zero energy cool chamber storage of fruits, vegetables, flowers, propagation materials, processed products and for production of mushroom. The zero energy cool chamber is presently being used by many farmers in Maharashtra for storage of horticultural produce. However, it needs more efforts for its popularization among the users.

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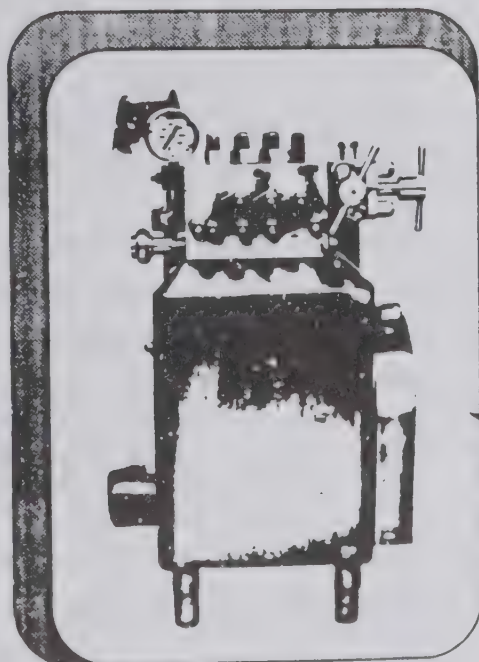
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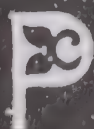
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CAN CORROSION*

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Metal can corrosion leads to considerable loss of valuable food product and often makes product unattractive and unacceptable. Can corrosion is mostly revealed by leakage, rust metal pickup of the product causing off-flavour and discoloration. Another form of corrosion noticed during storage is the underfilm corrosion originating at lacquer pores. They are often found where the code has been embossed on the bottom or top end and on the beads. External corrosion of can lead to the bad appearance of containers thereby impairing their marketability.

● THE ELECTRO-CHEMICAL PROCESS OF CAN CORROSION

Electrochemical processes take place between the can metal and the water, acids, salts and other substances in the product packed. In general, metal is not only dissolved by direct chemical attack, but mostly as a consequence of the formation of local elements, with a current flowing between the various metal layers and the aqueous solution. It is evident, therefore, that corrosion problems are not associated with dry products.

In tinplate, the coating of tin with its high degree of resistance to chemical corrosion, protects the steel base, which is a corrodible material. However, in most

electrolytic tinplates used today, the coating of tin is so thin and the number of minute pores in the tin coating is so large where the steel base is exposed, that the chemical properties of tin by themselves are not adequate to explain the remarkable corrosion resistance of tinplate. The real explanation lies in the electrochemical behaviour of the tin-iron couple, which is formed when tinplate is in contact with an electrolyte.

Since tin is nobler than iron, in the presence of any mineral acid solution, tin is cathodic to iron, and all the anodic corrosion is concentrated on the tiny spots of the exposed steel and eventually the sheet may be perforated. On the other hand, in a solution of fruit acids, free from oxidizing agents, tin many become anodic to iron owing either to the higher hydrogen overpotential of tin or the formation of stable stannous complex anions. In such a situation, the anodic tin slowly dissolves and hydrogen is liberated on the exposed steel surfaces. Thus the steel surface is protected at the cost of the tin. Moreover the corrosive effect on tin is so evenly distributed over wide area of tin surface that it is hardly noticeable, and if the hydrogen evolved is not removed by an oxidizing agent, the corrosion slows down and eventually stops. Therefore the key factor that promotes or

inhibits corrosion in tin plate is whether tin acts as a cathode or as an anode in contact with a particular food pack

Canned food product may be classified according to the product aggressivity into the following groups: a) tin dissolving, b) tin and iron dissolving, and c) iron dissolving products.

a) **Tin dissolving products:** Various products are called tin dissolving products because in contact with them, the iron of the can metal is the cathode. The iron/tin alloy layer FeSn_2 is exposed, which has a grayish-black colour. This layer provides a certain protection against corrosion. If oxygen is excluded during the filling operation, less tin will be dissolved.

Tin dissolving products include tomato pulp, gooseberries, citrus juices and sour cherries, to name just a few. Iron corrosion in such products is not critical, as the dissolving tin ions prevent pitting corrosion which endangers the shelf-life of the cans.

b) **Tin & iron dissolving products:** This product group dissolves tin and iron. The coupling potential $\text{FeSn}_2 + \text{Sn}$ is more positive than the iron potential. Typical products in this group

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are tomato soup concentrate, mandarins and apple sauce.

- c) **Iron dissolving products:** With these products, the iron of the can metal is the anode. Oxygen present in the product after filling causes an even higher iron pickup and leads to pitting corrosion. The dissolving tin ions no longer protect the iron. To avoid premature can failure by perforation, the exclusion of oxygen is mandatory in the filling of acid products. This condition is met in the commercial filling of carbonated soft drinks.

● FACTORS AFFECTING INTERNAL CAN CORROSION

Influence of constituents of food products: The number of processed food products packed in tins show a wide range of corrosion characteristics. The causes of these factors are not fully known. This is due to the fact that they are extremely complex systems with a different pH, different buffering properties and consist of different compounds which may either accelerate or inhibit metal corrosion and are often of a different consistency which may also influence the corrosion mechanism.

Effect of acidity: It is often believed by some processors that a higher acid content in the product increases the corrosion of tinplate. As the following examples will show, this cannot be generalized. White cherries, which are less acidic, were found by Hirst and Adam to be more corrosive than more acidic gooseberries(3). Addition of organic acids to dried prunes having a pH of around 4.0 made the tin anodic to steel, thereby, protecting the steel (4).

The addition of citric acid helps in reducing corrosion in blackberry cans. Similarly, the addition of citric acid, lemon, strained cranberry and pineapple juices, helps in reducing corrosion in the case of pureed prunes (5), (6). Corrosion in canned cherries is inhibited by the addition of 0.2 to 0.3 percent citric acid (7), but a larger addition of acid activates the corrosion reaction. In the case of strained strawberries and raspberries, the addition of citric acid accelerated corrosion. The addition of citric acid reduced corrosion in canned, dried prunes that were blanched prior to canning, but increased corrosion with prunes that were soaked in water overnight. Similarly, for mango juice, an increased concentration of citric acid from 0.3 to 0.4 percent accelerated corrosion. The inhibitory action of citric acid is supposedly due to the inactivation of some naturally occurring accelerators present in certain food products.

The extent of corrosion is related to the nature of organic acids and not to the concentration of acids. The potential relationship of tin and iron, coupled and uncoupled, depends on the acid used and some acids have much stronger tendencies to form complex ions with tin than others. For example, detinning in canned rhubarb and spinach has been attributed to the presence of oxalic acid (8), (9).

Mahadeviah *et al.* investigated the effect of vitamin C addition to mango nectar in plain cans (10). They determined that tin content and the extent of corrosion increased with the increase of vitamin C. The findings show that the ascorbic acid added to the mango nectar and the

decomposition product, furfural acts as corrosion accelerators in tinplate cans.

Effect and viscosity: It is often realized that the viscosity of the product may also influence the corrosion reaction. Mahadeviah *et al.* reported that nectars prepared from different varieties of mangoes showed that feathering and detinning decreased with increased viscosity of nectar (10).

Canned products containing sugar syrup, pectin, starch, gelatine or other thickeners are less corrosive. The difference can be often noticed when the same product is also packed in a diet version without sugar. The diet product tends to be more corrosive if acid is present.

Effect of natural pigments: Anthocynin pigments present in some coloured fruits are reported to act as accelerators of corrosion by serving as depolarizers. The beta-carotene of mango pulp, however, does not show any effect on corrosion.

Effect of ingredients used in canning of food products: Sugar and salt play a very important role in the corrosion process. For example:

Kohamn and Sanborn (12) found that increasing syrup concentration inhibits corrosion in dried prunes. Hirst and Adam reported the beneficial effect of beet sugar in reducing corrosion with strawberries and loganberries (13). The sugar used should not contain SO_2 as SO_2 accelerates corrosion.

Increased salt content in canned apple increase the rate of container perforation. Experiments conducted with acid solutions to which salt was

added showed that, the addition of salt inhibited the corrosion of tin but accelerated the corrosion of iron (11).

The azo-type food dyes used in low pH (2.5-4.0) carbonated beverages are reported to have high reduction rates and the corrosivity is reported to increase proportionately to the amount of the dye present (14), (15).

Certain meat products, such as goulash and pork, richly spiced with products containing sulphur compounds and free fatty acids are prone to corrosion. It has been shown that polyphosphates and other complexing agents such as sodium citrate can increase the corrosion of tinplate cans.

Corrosion due to nitrates and other substances acting as depolarizers:

Since the second World War, the rapid detinning of plain food cans filled with tomatoes, spinach, and green beans of high nitrate content has been observed. The high nitrate content in the product may originate from excessive nitrogen fertilization or from the brine prepared with nitrate contaminated water.

Many products contain oxidizing agents (i.e. depolarized) which enhance the dissolution of tin without liberating hydrogen gas at the iron cathode. If these oxidizing agents are present in adequate quantities, detinning of the canned proceeds very quickly without loss of vacuum as the escaping hydrogen is changed to water by depolarizers. Only in a later phase, when practically all the tin has been dissolved, will the steel base be attacked with a simultaneous liberation of hydrogen. During the detinning process, the nitrate is

changed via nitrate to an ammonium compound.

According to Johnson (16), fresh green beans contain approximately 425-880 ppm nitrate. By blanching the beans, the value was reduced to about 26 ppm nitrate so that hardly any detinning was observed.

Barbicri *et al.* found that green beans containing approximately 115 ppm nitrate in tinplate cans with E 5.6 tin coating on the inside could be stored for two years, provided they were inside lacquered (17).

The cause of pitting corrosion of inside-lacquered cans containing green beans cannot be clearly explained according to Davis *et al.* (18). The authors established that the iron pickup during storage increased with advancing pitting corrosion, thus the iron pickup might be used as an indicator of pitting corrosion during long storage.

Johnson investigated the influence of nitrate-containing water upon the corrosion of soft drink cans (16). He found that the corrosion takes place via nitrate and is accelerated by phosphoric acid. A maximum limit of 7-8 ppm nitrate was proposed for soft drinks.

In this connection, mention must be made of WHO Guidelines for Drinking Water Quantity (19), recommending an average nitrate content of 10 mg/litre, calculated as N (approx. 45 mg/litre as nitrate).

Wolff recommends the use of spinach with a low nitrate content for canning to avoid detinning (20). Spring spinach rather than autumn spinach should be used. The stems, which contain 2-3 times the amount of nitrate, should be removed.

Blanching also reduces the nitrate content.

Rauter and Wolkersdorfer reported on the nitrate content of other vegetables (21). Emilsen *et al.* determined that cabbage and sauerkraut juice have an inhibiting effect upon nitrate corrosion (22). An oil was isolated from white cabbage juice which inhibits detinning if added at 1 mg/L. to nitrate-containing system.

Other substances, apart from nitrates, which may act as depolarizers and accelerate detinning and corrosion, are sulphur dioxide, sulphur, trimethylamine oxide in canned fish, and oxygen in the headspace and in the product.

To avoid detinning, the amount of these substances in the can should be kept as low as possible.

Tagaguchi, who investigated detinning by trimethylamine oxide (TMAO) at pH values between 2.8 and 8.0, ascertained that the highest detinning occurred at 4.0. Tin liberation was proportionate to the amount of TMAO added. Detinning of fish cans owing to the addition of TMAO increased if the cans are stored at high temperatures (24).

Peel constituents in pulp and nectar prepared from unpeeled mangoes accelerated corrosion. Gallic acid present in the peels of mango have been found to act as a mild corrosion accelerator.

Corrosivity of tomato paste has been associated with the formation of hydroxy methyl furfural, dehydro ascorbic acid, diketo gulonic acid and demethylated pectins. Increased detinning in tomato paste has been

attributed to the difference in water-insoluble solids which vary according to maturity and the variety of tomatoes (26). For applesauce, Lopez noticed that corrosion was less in the product having high consistency (27). The rate of corrosion was minimum at pH 3.5-3.7. Dickinson found that stone fruits, such as plums, greengages and cherries which contain glucosidase, corrode lacquered tinplates more rapidly when the heat process used is insufficient to inactivate enzyme (28). In the case of sweet peppers, it has been found that peppers at the red stage cause more corrosion than green peppers of the same variety (29). With orange juice concentrate, corrosion has been reported to be abnormally high when stored at 37 degree C in plain cans, which is due to the rapid formation of hydroxymethyl furfural in higher concentrations.

While in many countries the tin content in canned foods is permitted up to 250 ppm, in others it is limited to 150 ppm. In this respect, Chang's patent, regarding the tin pickup of canned asparagus by the addition of cysteine hydrochloride (0.1-0.2 percent weight/volume) to the brine is of interest (30). This addition keeps the tin pickup at less than 30 ppm after 12 months storage.

According to Board (31), the oxide film on the tin and the cathodic dichromate treatment (passivation) together improve resistance against medium-aggressive products. This oxide film, however, is modified in the side seam area by the heat applied during soldering, so that corrosion concentrates on detinning of this area. This leads to a quick detinning of the side seam, making

the cans unmarketable.

Corrosion due to phosphates: The increasing use of polyphosphates in the meat industry has led to corrosion problems for tinplate cans. Polyphosphates reduce the vacuum in the can by liberating hydrogen and lead to detinning.

Effect of processing variables : Processing variables associated with canning, such as deaeration of the product, variation of headspace, headspace oxygen, vacuum, insufficient deaeration, filling temperatures, processing time and temperatures, cooling, and storage conditions of the cans adversely affect the corrosion of tinplate containers. Oxygen acts as a depolarizing agent and hastens the process of corrosion. Normally, in foods canned under satisfactory commercial practice, small quantities of oxygen are present and consumed to dissolve some tin in plain containers. If there is leakage in a can, the most extensive damage can occur, depending on the amount of oxygen present. In such cases, corrosion will be very high in some moderately corrosive products such as grapefruit or pineapple. Leakage in plain cans may result either in complete detinning of the can interior, perforation at different spots, or most commonly, severe detinning at and near the liquid level, accompanied by perforation at this point.

Vacuum and headspace oxygen in a can depend on the effectiveness of proper exhausting temperatures and closing temperatures. The effectiveness of proper exhausting in extending the shelf-life of can has been shown by many authors. For example Hirst and Adam showed that omission of exhausting resulted

in a one-third and nearly two-thirds reduction in shelf-life for loganberries and damsons, and plums, respectively (13). In the case of mango juice, the exhausting of filled cans before sealing helped in reducing the extent of corrosion only in the initial stage (33). Lopez showed that rates of corrosion in cans packed with different degrees of headspace and vacuum varied in direct proportion to the size of headspace and in inverse proportion to the degree of vacuum (27). In the case of pineapple juice, an increase in headspace decreased the shelf-life of a can. However, a decrease in headspace reduces the amount of hydrogen required to destroy the vacuum and therefore the time required to produce a hydrogen swell (13).

The addition of ascorbic acid at 300mg per pound of fruit controlled browning, reduces oxygen and protects the container from corrosion. The effect of initial oxygen content of the final corrosion of electrolytic tinplate cans containing apricots was studied by Catala et al (34). They found the statistically significant correlation between O_2 and Sn contents of products at the end of the storage. In the case of canned mango juice (33), deaeration before filling into cans helped in reducing the extent of the corrosion, but low filling temperature and less processing time did not affect the process of corrosion. The time lag between sealing and processing time did not affect the process of corrosion. The time lag between sealing and processing and high cooling water temperature accelerated corrosion.

Storage temperature: Storage

temperature has a great influence on the shelf-life of a canned product. Naturally at high temperatures the formation of degradation products is quick, which might accelerate the process of corrosion. For example, several food product cans stored at 22 degree C showed three times longer shelf-life than those stored at 35 degree C. With typical Australian food products, Davis et al (35) showed that the shelf-life of canned products at ambient temperature (25-35 degree C) was three to four times more than cans stored at 37.8 degree C (51).

Applesauce prepared by using pure sucrose and combinations of sucrose and corn syrup as sweeteners and stored at 20 degree C was tested by noting the increase of hydroxymethylfurfural (hmf), darkening of scrum colour, decrease in consistency and increased can corrosion.

Sulphur staining: If sulphur-rich products, i.e. products with sulphur-containing amino acids and sulphur compounds, are packed in plain cans, either brown, black or dark brown stains, depending upon the surface treatment of tin, appear on the inside of the cans after sterilization. This sulphur staining is essentially caused by the following factors:

- I. Temperatures above 70 degree C are responsible for the formation of hydrogen sulphide;
- II. The hydrogen sulphide may come from the sulphur-containing amino acids, e. g. cysteines, tripeptides, glutathions, mercaptans,
- III. The pH of the product used is also of significance;

IV. The formation of hydrogen sulphide is catalysed by product inherent enzymes, by various microroganisms (producing this gas as metabolic product), and by metal ions.

Krylova *et al* (36). investigated meat and sulphur compounds with pH values between 5.3 and 6.7. A shift of the pH to the alkaline side caused higher sulphur staining. Model tests by Gruenwedel and Chu indicated that Al, Fe and Sn ions promote the formation of H_2S from sulphur containing amino acids and thus sulphur staining (37). Sulphur staining occurs mostly at pH values greater than 5.0 and less frequently with fruit products. This discoloration of tin, which is not detrimental to health, is a visual defect which should be avoided. Sulphur staining is essentially due to reactions of sulphur-containing compounds of the product with the tin coating and not with the iron.

According to Kolb (38), and Hollander and Muller (39), hydrogen sulphide is mainly formed from cysteine, during heating of natural products. The authors therefore described the cysteine tests for the examination of lacquers and passivation for their sulphur resistance. Tinplate with cathodic passivation shows better sulphur resistance. Tinplate with cathodic passivation shows better sulphur staining resistance than that with chemical passivation. Forming, beading and punching damage the passivation layer, thus sulphur staining will occur first in these areas. Barbieri et al. found that anodic passivation treatment prevents sulphur staining.

Rapid corrosion has been observed in sweetened fruit juice

cans as a result of sulphur dioxide contamination in the sugar used. SO_2 may be present in sucrose depending on manufacturing conditions and may be a sulphur staining and a corrosion problem.

Sulphur staining can be prevented by using sulphur-resistant enamels, which contain aluminium or zinc oxide. Hydrogen sulphide or similar sulphur compounds produced from sulphur-containing constituents, react with zinc oxide to form zinc sulphide, which is white.

Effect of tinplate variables: Among the different constituents of steel base, while sulphur, copper and phosphorus affect corrosion, the other constituents do not have much affect. It has been recommended that copper contents of steel should not be less than twice that of sulphur, Hoar et al. stated that for corrosion resistance (41), the phosphorous and sulphur content in tinplate are kept as low as possible. The presence of more than 0.5 percent of copper increases the rate of corrosion of cans and an increase in phosphorus content in steel is detrimental, particularly in case of lacquered cans with many food products.

On the basis of laboratory experiments and industrial experiments, three types of steels have been specified for packing food products according to their corrosivity. They are: Type L, containing phosphorus 0.015 percent max, copper 0.06 percent max, for the most corrosive food; Type MR containing phosphorus 0.02 percent max. Copper 0.20 max for mildly corrosive products and Type MC, containing phosphorus 0.03-0.15

percent, copper 0.20 percent max. for less corrosive products and where the strength of the container is an important consideration. There is not much difference in the other constituents of different types of steel plates.

Thickness of tin coating: The shelf-life of a product increases approximately linearly, with increasing thickness of tin coating. Mildly corrosive products can be packed in cans made from tinplate with low tin coating. Depending on the corrosivity of the product, higher tin coating weights should be used. For very highly corrosive products, however, lacquered cans are suitable.

Porosity of tinplate: The tin coating of tinplate of plain cans always contains a number of minute discontinuities called pores. These discontinuities may extend through both the tin layer and compound layer. The pores are not visible to the unaided eye, but their presence affect the protective value of the tin coating. Porosity of the tin coating can be correlated with its thickness. Tinplates with porosity produce hydrogen swells more readily than those which are coated with more uniform layers of tin. Porosity is more relevant to the external rusting of tinplates. In the interior of the food cans, however, its importance is reduced by the anodic behaviour of tin and the stannous ions. The number of the pores was found to be less important than the area of the exposed steel.

Tin-iron compound layer: The composition of the tin / iron alloy layer influences the corrosion behavior of the tinplate. While there is no conclusive evidence to

show that the quantity of tin/iron alloy layer influences the corrosion of tinplate, there is a good evidence that the quality of alloy layer is strongly influenced.

The electrochemical characteristics of the tin/iron alloy layer would depend on the nature of the product packed. Grade K-plate is used for certain citrus products.

Structure of tin coating: The importance of the grain structure of tin coating on the corrosion behaviour of electrolytic tinplates was realized and it was observed that the small grain structure of tin coating led to the active corrosion of some fruits and vegetable products. Tinplate with a grain size smaller than ASTM-9 are usually not considered suitable for canning fruits and vegetables. The grain size of the tinplate depends on the quenching practice in the flow melting operation.

● EXTERNAL CORROSION OF CANS

Rusting on the outside of the cans is predominantly caused by condensed humidity. The extent of rusting depends on the thickness of the tin coating and the quality of the lacquer film. Rusting on the outside may further be caused by a number of factors, such as:

1. Hard wiping of side seams at the time of can manufacture
2. Scratches on tin coating
3. Use of rusty retort baskets
4. Product residue on the cans.
5. Product residue on leaking cans, i.e. fermenting product residue forms acetic acid, which perforates the outside of tinplate and aluminium cans

6. Residual cooling water plus salts dissolved therein and excessive chlorine doses.
7. Salt content of label papers
8. Salt content of box board
9. Humidity from labels and boxes
10. Poor conditions of storage
11. Location of storage
12. Storage in corrosive atmosphere
13. Residual roll salts, a salt used in solder both for fluxing solder rolls

Outside corrosion of cans may cause damage rendering complete batches unmarketable.

Wilhelm and Peterman (46) and Hollaender (47) reported on the causes of corrosion by paper labels and boxboard. Their findings formed the basis for the test methods outlined in Code of Practice 30 and 36. The corrosion of tinplate cans by paper labels is influenced by the pH, the amount of sodium chloride, sodium sulphate, copper and certain paper-making substances, e.g. formic acid / formate, ammonium salts, sulphite, as well as oxidizing constituents like peroxides. In addition, the glue used must be taken into consideration. Because of the many factors responsible for the corrosion by paper labels and boxboard, direct testing according to Hollaender (48) in accordance with the cited codes of practice is to be preferred in commercial operations.

According to Board (31), the cooling time after sterilization of large cans filled with solid products is relatively long and as a result cans may already start rusting during

cooling, particularly if the cooling water is hard and has a high oxygen content. The author recommends the addition of 600 - 1000 ppm sodium or potassium nitrite to the cooling water to avoid outside rusting of the cans.

Middlehurst and Parker (49) who examined the formation of condensation water on food cans, summarized their recommendations for the elimination of rusting as follows :

1. Do not include humid material in the shipping container;
2. Avoid temperature differences in the shipping container by using insulated containers;
3. Use packaging material that inhibits water vapour transmission. In addition, it is expedient to empty the shipping containers as quickly as possible and to warm the boxes, if necessary.

Other contributory factors, such as scratches on tin coating in cans, exposes the steel base with a consequent danger of corrosion. Besides, high temperatures of storage of about 23.5 degree C, exposure to moisture causing the cans to sweat, location of storage near a sea coast, the use of unsuitable adhesives, storage in the corrosive atmosphere, can all lead to external corrosion.

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MINIMAL PROCESSING OF FRUITS AND VEGETABLES

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ABSTRACT

The aim of this review article is to assess the production, quality and safety of minimally processed products, which have been essentially tailored to satisfy the demand of quality and convenience of the present day consumer. The paper highlights the characteristics, advantages and problems associated with such products and their scope and future in India in the next millennium.

Consumer is the most important person and a guiding force in today's global and liberalized market. He is at the helm of affairs and a reigning emperor deciding the purchase of food items in the competitive market. Overwhelming urbanization, fragmented life styles, nutritional awareness and dual incomes have further made the consumer more demanding and less predictable. Quality and convenience are the new mantras in the food market. Consumers' renewed interest in fruits and vegetables as health foods with low cholesterol, low to no fat and sodium, high levels of vitamins, minerals, fiber and more recently potential antioxidants has accelerated the consumption of fresh fruits and vegetables. This has had major implications for the food technologists. Consumer orientation, flexibility and product innovation are essentials. It is here that the concept of minimally

processing (MP) or light processing or extended shelf life refrigerated foods has emerged to satiate the demand of high quality and convenience of the consumer. The expanding business of hotels and catering has also led to the need for such processed foods. The production of such high quality convenient, minimally processed products presents unique challenge for the horticulturists and food processors.

Minimal or lightly processed operations have been defined as those procedures such as washing, sorting, trimming, peeling, slicing or chopping that doesn't affect the freshness of vegetables. The result of such operations is convenient fresh products that can be prepared and consumed straightway in less time (Burns, 1995). In other words MP has all the attributes of convenience and freshness and the processing and distribution are accompanied in a highly integrated system (Cantwell,

1992, Huxoll and Bolin, 1989). In Europe, particularly in Netherlands, France and UK the market for MP fruits and vegetables has grown considerably during 1990's. In USA it is believed that market share for fresh and cut produce will account for 25% of all produce sales in US retail market by the year 2000. MP has two objectives; firstly it keeps the produce fresh yet supply is made in a convenient form without losing its nutritional quality. Secondly the product should have a shelf life acceptable to its intended consumers.

Extended shelf life refrigerated foods (ESLR) is another term very close to minimal processing. (March, 1998). It includes some other products, which are not covered under the definition of MP. These are the foods that have received minimal processing or pre-cooking and have an enhanced but limited shelf life; refrigeration is the key preservation measure. These foods include conventional products such as

luncheon meats and cured meat as well as new generation of partially processed refrigerated foods (NFPA, 1988) such as meat, seafood, eggs and vegetable salad, fresh pasta sauces, other sauces, soups, entrees, complete meals and uncured meat and poultry items. *Sous-vide* foods cooked inside a hermetically sealed plastic package under vacuum are also included in this definition. If extended shelf life refrigerated foods are heat processed, the heat treatment is much less than required for commercial sterility. Canned foods are therefore excluded from this category. *Sous-vide* foods and others that require a lower heat treatment than that used for canning and that require refrigeration are described by some authors as "refrigerated processed foods of extended durability" (Peck, 1997).

Characteristics and advantages of MP

All MP fruits and vegetables are perishable and demonstrate rapid quality deterioration over time under ambient storage, as a result of tissue damage resulting from processing operations such as cutting, slicing, shredding, peeling, trimming, coring and the like (Ahvenainen, 1996). Undesirable physiological changes are one of the most crucial problems in minimal processing. Loss of cellular integrity at the cut surface destroys compartmentation of enzymes and substrates. Browning reaction and formation of unwanted secondary metabolites often result as a consequence. Senescence may

accelerate and off-flavours may develop as respiration and ethylene production increase near the cut surface. Also exudate from the cut surface serves as a medium for fungal and bacterial growth. As the product is further handled, opportunities for contamination and growth of micro-flora increases along with the health risks for the consumer (Brecht, 1995).

Minimally processed products offer a number of advantages as prepackaging allows for more efficient portion control. Solid waste disposal problems are reduced. Demands on limited refrigerated storage space are reduced and inventory of raw produce is minimized. Supply of a variety of ready-to-eat items that exhibit excellent uniformity of quality and identity is available over many weeks (Schlimme, 1995).

Physiology of MP : The physiology of MP is essentially the physiology of the wounded tissue. The type of processing involving abrasion, peeling, slicing, chopping or shredding differs from traditional processing in that the tissue remains viable or fresh during subsequent handling (Brecht, 1995). Wounding which accelerates deterioration and senescence in vegetative tissue induces increased respiration and ethylene production. Many factors affecting the intensity of wound response in MP tissues include specific variety, stage of physiological maturity, extent of wounding, temperature, oxygen and carbon dioxide concentration,

water vapour pressure and various inhibitors. Storage temperature is one of the important factors affecting the physiology of MP. Since MP is not heat treated, regardless of the use of additives or packaging, they must be handled and stored at less than 5 °C to achieve a sufficient shelf life and ensure micro-biological safety. Excellent reviews (Roll and Chism, 1987; Huxsoll et al, 1989; King and Bolin, 1989 and Millers, 1992) on physiological aspects have appeared in the recent years.

Important Steps in the production of Minimally Processed Produce

Raw Material : Correct choice of raw material is vital for the production of vegetables of good quality (Wiley, 1994 and Romig, 1995). Processors need to select high quality of raw material with low levels of microorganisms especially psychrotrophs. They need to determine potential microbiological hazards for ingredients using microbiological specification for ingredients to minimize risk (Moberg, 1989). The correct choice of variety is particularly important in case of carrot, potato and onion; e.g. carrots and rutagaba var. that give the most juicy products cannot be used in production of grated products, that need to have a shelf life of several days. No systematic study has been made on the suitability of different varieties for minimal processing.

Peeling, cutting and shredding On an industrial scale peeling is normally accomplished mechanically e.g.

using rotating carborundum, chemically or in high-pressure steam peelers (Wiley, 1994). The browning of potatoes peeled with carborundum was much greater than that of hand peeled potatoes. Carborundum peeled potatoes must be treated with a browning inhibitor, whereas washing in water is enough for hand peeled potatoes.

Many studies confirm that cutting and shredding must be performed with sharp stainless steel knives or blades. Ohta and Sugawara (1987) found that sharp blade slicing or rotary cutting of lettuce were both superior to either dull blade slicing or chopping. O'Beirne (1995) has obtained similar result with carrot discs. Carrots cut with razor blades were most acceptable from both microbiological and a sensory point of view than carrots cut using various commercial slicing machines. It is clear that slicing with dull knives impairs the retention of quality because it ruptures the cells and releases tissue fluid to a greater extent. Mats and blades that are used in slicing operations can be disinfected, for example, with a 1% hypochlorite solution. A slicing machine must be installed securely, because vibrating equipment may impair the quality of sliced surfaces.

Cleaning/washing and drying: Normally two washings are performed in case of MP, one before cutting and one after cutting. The microbiological and the sensory quality of washing water must be good and its temperature low,

preferably $<5^{\circ}\text{C}$. This not only removes microorganisms and tissue fluids reducing microbial growth but also seals the surface of the vegetables and inhibits enzymatic oxidation during subsequent storage. The recommended quantity of water that should be used is 5-10 l/kg of product before peeling and/or cutting and 3 l/kg after peeling and/or cutting to extend shelf life (Ahvenainen et al, 1994). Data on the effectiveness of chlorine compounds on the microorganisms found on the fresh fruit and vegetable are contradictory even though the chlorine compounds are quite effective in inactivating microorganisms in solutions and equipment (Brackett, 1992). The major disadvantage associated with it is that its effectiveness is limited with some products; e.g. suppressing growth of *Listeria monocytogenes* in shredded lettuce (Beuchat and Brackett 1990) or completely eliminating *Salmonella Montevideo* from inoculating tomatoes (Richardson 1994). Consequently the safety of chlorine used for food or water treatment has been questioned and further, regulatory restrictions may require the development of alternatives (Hurst, 1995). The latest has been the use of H_2O_2 . It is generally recognized as safe chemical for use in food products as a bleaching, oxidizing, reducing and antimicrobial agent. (Simmons and Sapers, 1998).

A significant reduction in number of germinable spores of *Botrytis cinerea* was noticed in grapes when it was exposed to

vapour with 30-35% H_2O_2 at 40°C for 10 min. Simmon et al (1995) found that exposure of raisins to H_2O_2 vapour for 60 min reduced mold count to 0 in 17 out of 20 cases. Thus H_2O_2 vapour treatment may be a promising technique for disinfection of raisins. Washing of mushrooms with dilute solution was investigated as an alternative to H_2O_2 vapour treatment (Saper et al. 1994).

Good control of bacterial blotch and browning was achieved with a mushroom wash formulation containing 1% H_2O_2 and 1000 ppm of EDTA (McConnell, 1991). Dipping whole vegetables, cucumbers, green bell pepper and Zucchini in 5-10% H_2O_2 for not more than 2 min prior to slicing was highly effective in delaying soft rot. Thus H_2O_2 seems to be a promising disinfectant and an alternative to chlorine for disinfecting and extending fresh cut fruits and vegetables without leaving significant residue or causing loss of quality. After washing, removal of residual solution is indispensable or its presence would accelerate spoilage. Centrifugation has been the widely adopted method.

The rate and time of centrifugation are important factors. Ohta and Sugarwara (1987) obtained the best shelf life by drying it in the basket type centrifuge (basket diameter, 52 cms, at 1000 rpm for 30 seconds). Spin drying also has been recommended in certain cases (Gil et al, 1996). Use of preservatives and additives when used in washing water improves shelf life and sensory quality of the

products. Calcium chloride (0.5-1.0%) maintained firmness and reduced microbial growth of carrot shreds. However there was no effect on storage quality of sticks and slices (Izumi and Watada, 1994). Citric acid dip inhibited the development of black speck and browning and extended storage life from 10 days of control to 14 days at 50° C (Kim and Kleiber, 1997). Citric acid and ascorbic acid alone or in combination with potassium sorbate in the case of potato or 4-HR in case of apple, seem to be promising alternatives for sulfites, particularly when hand peeling is used. Apart from additives, certain gas absorbents like potassium permanganate can effectively reduce the sulfur volatiles and carbon dioxide in packed diced onions. Acceptable quality of diced onions could be retained for ten days using KMnO_4 gas absorbent (Howard et al, 1994).

Modified atmosphere packaging (MAP) : The basic principle in MAP is that a modified atmosphere can be created either passively by using properly permeable packaging materials, or actively by using a specified gas mixture together with permeable packaging materials. The aim of both principles is to create an optimal gas balance inside the package, where the respiration activity of a product is as low as possible. The gas composition in general should be around 2-5% CO_2 , 2-5% O_2 and the rest being nitrogen (Kader et al, 1989 and Day, 1994).

Packaging forms the most difficult part of manufacturing ready-to-use and ready-to-eat fruit and vegetable products of good quality and prolonged shelf life. None of the packaging materials available in the market are permeable enough (Day 1994). Optimal O_2 - CO_2 atmosphere cannot be maintained by use of most of the films, especially when the produce has a very high level of respiration. One solution to this problem is to make microholes of a defined size and defined number in the material to avoid anaerobis (Exama et al, 1993). The best example being the improvement of shelf life of grated carrot (Ahvenainen et al, 1994). Combinations of ethylene vinyl acetate with oriented polypropylene and low-density polyethylene or the combination of ceramic materials with polyethylene have also proved useful as both the combinations have significantly high gas permeability. But this is still not enough to get the maximum shelf life. The shelf life of shredded cabbage and grated carrots packed in these composites is 7-8 days at 5° C. This is 2 - days longer than in the oriented polypropylene, which is generally used in the vegetable industry. These materials have good heat sealing properties, easily available and normal air can be used for packaging (Hurme et al, 1994 and Ahvenainen et al, 1994). Recently a new breathable film has been patented which comprises of a two ply-blown co-extrusion, approximately 25 μm thick with an outer layer of K-Resin KR 10 and inner metallocene

polyethylene layer. It is claimed that fresh salads washed in chlorine solution and packed in this film have a shelf life of 16 days at 1-2°C (Anon, 1996). A number of attempts have been made in different laboratories to study the gas changes taking place within the packaging material (Wiley, 1994 and Kader et al, 1989). Most attempts recognize the interaction of respiration by the packaged products and diffusion of respiratory gases through the package. No. universal model for MP produce (peeled, sliced, grated, shredded) can be created. Creation of model gas changes and gas balance inside the package may not be enough to increase the shelf life of packaged material by a few days. This is because respiration is not the sole cause of quality changes taking place in MP produce, but enzyme and microbial activity, and in some cases presence of ethylene can also result in the development of colour problems, off-flavour and off-taste, (Ahvenainen and Hurme, 1994).

Modified atmosphere packaging is being used commercially for MP such as cut lettuce, carrots and cabbage, although current design is not sufficient to prevent the onset of fermentation under normal marketing conditions. (Cameron et al, 1995). In these cases fermentation alters the flavour and quality of the product but apparently does not render it inedible to the average consumer compared to the increased convenience. The approach will not work for products such as broccoli that produces offensive off-odour and

off-under O_2 conditions. The development of sense-and-respond packages may help to overcome these problems particularly if they are used in conjunction with detection or indicator systems that provide colour change to advise consumers against eating the packed product.

Edible Coatings : Edible coatings are another possible packaging method for extending the post harvest storage life of MP foods (Baldwin et al, 1995a,d), Use of edible coatings for MP fresh produce is mostly in experimental stage. These coatings are generally made from lipids, resins, polysaccharides and proteins. In addition, plasticizers such as polyhydric alcohol, waxes and oils are added to improve flexibility and elongation of polymeric substances. (Andres, 1984, Chuah et al 1983 and Schultz et al 1949). Addition of surface-active agents (surfactants) and emulsifiers reduces superficial water activity and rate of moisture loss in food products (Roth and Loncin 1984).

Coatings not only perform the specific function of coating but also serve as carrier of antimicrobial agents/antioxidants Calcium chloride coatings create a barrier that retards loss of desirable flavour volatiles and water vapour, and restricts exchange of CO_2 and O_2 creating a modified atmosphere. Applying a semi-permeable membrane such as edible coatings can also reduce the high respiration, ethylene production and moisture loss resulting from processing.

Processed piece of apple coated with casein, lipid acetylated monoglyceride stearate and bees wax mixture was protected from moisture loss and oxidative browning for upto three days. Incorporating bees wax into a sodium caseinate film was most effective in reducing water vapour permeability than stearic acid or acetylated monoglyceride. White blush in MP carrots due to dehydration and lignin formation was reduced by sodium caseinate and stearic acid emulsion (Avena-Bustillos et al, 1994). A cellulose based coating called, Natie-seal (Nisperos-Carriedo and Baldwin, 1993) significantly reduced white blush on peeled carrot for upto one month at $4^\circ C$. (Sargent et al 1995). Dipping shredded cabbage in sucrose fatty acid esters (0.25%) reduced browning (Sakane et al, 1990).

Active packaging involving addition of O_2 and CO_2 scrubbers and emitters and ethanol emitters etc. is another challenging and interesting area where only a few reports are available and not much work has been done.

Sanitation : Product safety is the critical sanitation issue of the Minimal Processing Plant (MPP). To ensure product acceptance, safety is the single greatest challenge for the industry. Processing of the product and employee practices are some of the factors influencing the plant sanitation. These include sanitary lay out of processing facility, processing rooms with positive airflow and sanitary design of processing

equipment. Special attention must be given to smoothing out rough wads and avoiding the inclusion of dead spots. In the plant, chlorination is the primary form of sanitation used in water system of MPP plants (Hurst, 1995). One of the greatest potential sources of bacterial pathogen is the employee who physically handles products during their preparation. Food handlers are vectors of disease transmission if they are carriers of pathogens and practice poor personal hygiene. The ultimate answer to achieve safety is by instituting HACCP (hazard analysis critical control point) inspection of MPP plants (Scott, 1993). Under HACCP, emphasis is on product safety (especially microbiological) and quality. The development and implementation of HACCP involves identification of air potential areas, where bacterial pathogen may be introduced as produce moves from the field to consumer. Hazardous areas would be the designated critical control points (CCP). This plan would consist of continuously monitoring these CCP's using appropriate document procedures to ensure that bacterial pathogens do not become part of product. In a nutshell, the goal of HACCP is to nip the hazard in the bud. GMP's and hygiene are prerequisites for implementing an effective HACCP system which is becoming a key word for securing the highest level of food safety and thus quality in developing countries too.

Microbiological Concerns :

Microbial load is the key concern of the MPP. Lack of processing treatments in pursuit of high quality makes the minimally processed vegetable most vulnerable to microorganisms. Microbiology of minimally processed products is the most important subject that needs systematic study. Also it is important to lay down threshold values beyond which a product can be considered spoiled. This element is indispensable and needs detailed research. The high initial load of microorganisms makes it difficult to establish the cell number threshold beyond which the product gets spoiled.

Microbial counts of commercial MPP produce have also been studied in Italy (Torriani and Massa, 1994 and Manazano et al, 1995) and in USA. In general, vegetables fall in low acid category (pH 5.1-6.0) and their large number of cut surfaces during peeling, cutting and shredding provides ideal conditions for the growth of microbes in minimally processed vegetables.

The chief microbiological concern associated with these products centres around the two types of microorganisms, psychrotrophic and mesophilic pathogens that could grow during temperature abuse. Most of which could be natural or can develop during the preparation stages. The natural microbial flora in fresh vegetables largely depends on the growth of environment quality of irrigation water and post-harvesting

operations and manufacturing operations including peeling, cutting and shredding. The production of products under non-hygienic conditions may result in further contamination. The higher water content of vegetables and enzymatic reactions releasing additional nutrients during and after the mechanical preparation provide optimal conditions for the growth of spoilage organisms. Simultaneously the growth risk of pathogen organisms like *Listeria monocytogenes* increases.

Spoilage microorganisms : With sufficient time at reference temperature, several types of both yeasts and molds which grow to levels that cause food spoilage include *Acinobacter-moraxxella* group, *Alcaligenes* sp, *Flavobacterium* spp, *Microbacterium*, *Lactic acid bacteria* and *Pseudomonas* spp. *Pseudomonas*, *Erwinia* spp, was found to be the predominant micro-flora of fresh leafy vegetables with an initial count of appx 10^5 colony forming units (cfu). *Aeromonas hydrophila* was found to be commonly associated with salads. Correct hygiene practices including the application of HACCP principles and GMPs are of utmost importance to curtail the microbial contamination.

Multiple barriers/Hurdle concept : Referred as the combined preservation (Leistner and Gorris 1995; Scott (1993), the approach combines several factors at sub-inhibitory concentrations that can effectively control microorganism in refrigerated foods.

Common hurdles include physical heat treatment, a_w , pH and preservatives when used together, hurdles interact synergistically enabling the use of lower intensity of each factor than would be necessary if each were used alone.

Marketing : Successful marketing of MP is inexorably a prime requisite to achieve high level of sensory quality. This is essentially dependent on several factors, including harvest timings to achieve peak quality, quality control for post harvest life, effective packaging using in-form graphics, competitive pricing and providing service at all levels of distribution system. (Schlimme, 1995). Temperature maintenance has been identified as the primary marketing tool and assured fast delivery of products to multiple customers through refrigerated vehicle in a short period. Capability to deliver finished products to customer within 24-36 hours from receipt of an order is considered a vital merchandising potential.

Scope in India : It will be difficult to believe that MPPs are not new to our country although the form in which they are marketed may be crude. The sight of propelled, cut carrots, radish and cucumber, peeled pineapple slices and oranges placed over a block of ice has been common in the busy markets and commercial office complexes. The vendors make good business and the consumer gets convenience. Housewives prefer to purchase clean and pre-cut spinach, mustard and fenugreek leaves for

making *sarson-ka saag*. The start has already been made and it is the right time for such raw ideas to be taken to laboratories and translated into refined technology to cater to the needs of large segments of population. With increasing urbanization and more and more women having to work, time for traditional cooking is becoming limited. Mobility and convenience are now the buzz words. In this regard, frozen foods and minimally processed foods would be the foods of the millennium and 2000 would be essentially the age of 'precut' foodstuffs. But as the old adage goes, it is "Easily said than done". Minimally processing industry is beset with a lot of hurdles before it can establish itself as an industry in India. The tropical climate, lack of hygienic culture and lack of cold chain are the major hurdles for the development of this industry. Changing the employees attitude and making them aware that good sanitation does make a difference in ensuring safety are important. Education training programme on plant sanitation and employee hygiene is the best mechanism to instill this awareness. Minimal processing has big scope in hotel industry and fast food chain restaurants. There has been a continuous demand of precut salads, shredded onions and cabbage from airlines. The major impetus for such precut produce would be in the area of packed fruit and mixed vegetable salad that can provide convenience for home consumption. The success in this field would depend on the

application of strict sanitation in processing, improved technology in packaging and an intense commitment to strict attention to maintain correct low temperature throughout the cold chain from distribution, storage and display to handling and use by the consumer.

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Box 1. Essential Requirements in Minimal Processing of Fruits and Vegetables.

- ☐ Good quality raw materials (correct cultivar, variety, cultivation, harvesting and storage conditions).
- ☐ Strict hygiene and good manufacturing practices, use of HACCP.
- ☐ Low temperature during processing.
- ☐ Careful cleaning and washing before and after peeling.
- ☐ Good quality water (sensory microbiology, pH) for washing.
- ☐ Use of mild additives in washing water for disinfection or prevention of browning.
- ☐ Gentle spin drying following washing.
- ☐ Gentle peeling.
- ☐ Gentle cutting, slicing and/or shredding.
- ☐ Correct packaging materials and packaging methods.
- ☐ Correct temperature and humidity during distribution and retailing.

[Adapted from Ahvenian, (1996).]

GENERAL ARTICLES

PREVENTION OF FOOD ADULTERATION ACT 1954- ARBITRARY AND IRRATIONAL LAWS, RULES AND REGULATIONS

George Issac

The Malabar Coast Products, Kottayam, (Kerala)

The prevention of Food Adulteration Act 1954 cover the entire food industry, from small producer of milk, to wayside tea shops, producers, processors and vendors, large and small, five star hotels and multinationals like Hindustan Lever and Nestle i.e a very large sector of our economy- and this law is intended to play a vital role in ensuring the health of the people.

The Act, as its title implies, is intended to ensure 'safe Food' for the people of this Country, but after fifty years, the food in India is perhaps the most unsafe in the civilized world. This is because the Act is implemented, not to restrict the content of the residues of insecticides and pesticides and other farm chemicals, heavy metals, bacterial contamination etc., in food, but to prosecute small producers and vendors for the contravention of a variety of standards -contraventions that are, for the most part, inconsequential in terms of health and food safety.

The Act is implemented, in effect, to maintain a regime of terror and extortion, which in the extent of its coverage, its destructiveness, is without parallel

in any modern, civilized democratic country' (The Committee under retired Chief Justice of the Supreme Court of India, Justice E. S. Venkataramiah pinpoints the 'zeal'- not for the health of the community, but for 'punishment' which permeates the implementation of the Act-to 'the stringent penal approach' etc., while criticizing its many arbitrary provisions.)

Specifically, the Act is implemented so as to maximize prosecutions-without any particular concern for public health or food safety, to ensure the success of these prosecutions, and to impose on those convicted the draconian punishment six month minimum jail sentence mandated in the Act-in flagrant violation of Articles 14 and 15, 19(g) and 21 of the Constitution.

The Ministry of Health and Family Welfare, Government of India first widened the possibilities for prosecutions during the Emergency, by amending the Act so as to extend the definition of the word 'adulterated' to include not only contravention of standards notified by the Ministry of Health and Family Welfare, Government

of India, that render food injurious to health, but also contravention of notified purity and quality standards-even where such contravention are inconsequential in terms of health and food safety.

The Ministry of Health and family welfare, Government of India, further widened the scope of prosecutions under the Act by denying trade and industry information concerning the methods of analysis to be used to determine compliance with such notified standards -and also access to accredited laboratories where samples may be tested for compliance.

It is the recognized practice for standards organizations eg., the codex Alimentarius, the International standards Organization, the Bureau of Indian Standard, the Agmark authorities etc., to assist those required to conform to their standards by providing information concerning the methods of analysis to be used and to accredit laboratories in which compliance may be tested but the Ministry of Health and Family Welfare, Government of India is unique - it denies Indian trade and industry such information and facilities!!

The P.F.A standard for fresh milk in Kerala is typical of the many arbitrary and irrational standards notified by the Ministry of Health and Family Welfare, Government of India, under the Act, with the specific intention of enlarging the scope for prosecutions. This standard requires that fresh milk containing less than 3.5% fat and 8.5% non fat solids be deemed 'adulterated'!- though it is well known that these constituents of milk are subject to wide variations due to natural causes, though extensive studies by the Kerala Agricultural University evidence that most of the fresh milk, produced in Kerala, does not conform to these requirements - due to genetic reasons, and though fresh milk is not deemed 'adulterated', in any civilized modern country, for the sole reason that it is deficient in fat or nonfat solids,

The provisions in the Act to ensure the integrity and representative character of samples drawn by Food Inspectors are inadequate. For example, there is no provision in the Act or rules that require that milk be properly homogenized before sampling, though fat and nonfat solids are not uniformly distributed in milk. At the same time the Act was amended during the Emergency to cripple the defense by deleting the provision in the original Act which required that Food inspector give one of the sealed sample drawn by him, to the vendor concerned, which he, that is the vendor, could have analyzed independently to defend himself!

The Act contains a provision that gives the impression of

restricting the obvious injustice in denying the vendor concerned a sealed sample. It provides that the concerned court may arrange for a second analysis- but there are two restrictions on this provision- the first, that this second analysis may be carried out only in the a designated Central Laboratory may not may not be questioned in court. There are no such restrictions anywhere in the Indian criminal law or in the criminal laws of any civilized modern country!!

Parliament has sought to ensure the accuracy, reliability, standardization and uniformity in analysis of samples by public Analysts- and to provide trade and industry the information and facilities it requires for voluntary compliance. The Act requires that the methods of analysis and the laboratories used for the purpose of the Act, be selected by the Central Government, notified, gazetted and approved by both houses of Parliament. The Ministry of Health and Family Welfare, Government of India has defeated the intention behind this statutory provisions by the simple expedient of not implementing them. In the event, the method used for analysis are arbitrarily chosen by the Public analyst concerned, and are on their own admission, secret, and 'for official use only'!!- At the same time, the laboratories in which Public Analyst test samples, have not been certified, by the Central Government or any other independent competent authority, for their ability to analyze samples accurately and reliably!!

Parliament has incorporated a provision -see Section 20 of the Act to protect trade and industry from indiscriminate and vexatious

prosecution based on defective sampling and the inaccurate analysis of samples by Public Analysts. This provisions requires that state government designate an independent third person to apply his mind to the facts of the facts of the case i.e the sampling procedures followed by the Food Inspector, the results of analysis by the Public Analyst etc., that he decide whether a whether a prima facie case of 'adulteration' exists or not. Based on such application of mind, this 'person' must then, either 'consent' to any prosecution proposed by the Food Inspector, if such prosecution is, in his opinion, necessary in the public interest, or take such other action as is provided for in the Act-prohibit sale, seize or destroy stock, cancel licences etc. However state governments have defeated the intention of Parliament and the relevant decision of the Supreme Court, by the simple expedient of dividing the power intended for the third 'person' between Public Analysts and Food Inspectors- by permitting Public Analysts to decide whether the samples they analyze are 'adulterated' or not, and conferring on Food Inspectors the authority to 'consent' to any prosecutions they themselves propose...!! In effect the statutory requirement for 'application of mind' by an independent third party has been eliminated!!

Finally, in any rational and just system of law, it is the courts that decide penalties. They do so by relating the intentions of the persons accused of the alleged misdemeanor to the injury caused to the individual or the public by such misdemeanor. However the Act was

amended during the Emergency to deny the courts the discretion to decide penalties on the basis of such rational calculations-and instead to mandate an irrational, arbitrary and fundamentally unjust, minimum six month jail sentence,

The expert committee, set up by the Government of India, under retired Chief Justice of the Supreme Court of India, referred to earlier, has described the philosophy of the Act as 'punish at any cost' and 'the higher the punishment the better'

The Prevention of Food Adulteration Act needs to be amended in the light of the observations of the expert

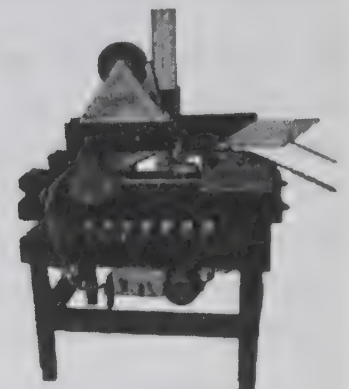
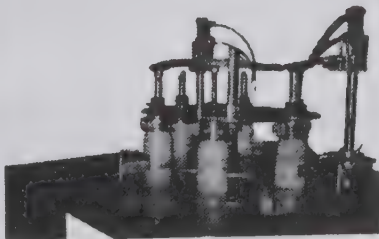
committee under retired Chief Justice of the Supreme Court of India, Justice E.S.Venkataramiah, whose observations have yet to be made public by the Director General of Health Services & Family welfare, Government of India, who was incidentally, a member of this committee,

Specifically, the Act should be amended to remove the confusion that surrounds the meaning of the word 'adulterated' by making it clear that unless the contravention of a notified standards is 'injurious to health', the concerned food cannot be deemed 'adulterated', so that the vendor concerned is given one of the samples drawn by Food Inspectors, so that the defense is

given the right to have a sealed sample analyzed in an independent laboratory and to question the results of any analysis in a Central Laboratories, so that only method of any analysis and the laboratories that have been selected by the Central Government, notified, gazetted and approved by both houses of Parliament are used for the purpose of the Act, so that Public Analysts are prohibited from 'finding' whether samples are 'adulterated' or not, so that state governments are prohibited from conferring the power of 'consent' contemplated in section 20 of the Act on Food Inspectors and so that the discretion to decide penalties is restored to the courts.

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PROJECT MANGO - AN ACTION PLAN

MEASURES NEEDED TO PROJECT AND PROMOTE THE MANGO PROCESSING INDUSTRY

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1. OBJECTIVE / MISSION :

Creating and maintaining, year after year, adequate supplies of mango, proved suitable for industrial processing and accepted by the domestic and export markets, procurable at economic prices.

2. SHORT-TERM MEASURES TO TACKLE THE IMMEDIATE PROBLEMS FACING THE INDUSTRY

- a) A massive and powerful campaign for the total eradication of the mango stone weevil pest must be mounted on a war footing and the pest eliminated within a maximum period of three years.
- b) The ripening and related physiological problems of irrigated mango must be tackled on highest priority. A sound, rational system of irrigation, free from attendant ripening and other post-harvest problems must be evolved.
- c) the varietal base of mangoes suitable for processing must be expanded. The possibilities of reviving the growing of *Khader* and *Appoos* varieties of mango, which are considered synonymous with or ecotypes of *Alfonso* variety, may be

explored in this regard. These varieties were earlier grown in parts of Andhra Pradesh, such as, Chittoor and Krishna districts. Likewise, promising hybrids like *Neeleshan*, *Neeluddin*, *Swarna - Jehangir*, and others may be critically evaluated for their processing qualities.

3. LONG-TERM PLAN

This has both pre- and post-harvest aspects :-

- A. Development of at least two commercial varieties in each of the principal mango growing regions of the country suitable for industrial processing and acceptable for the domestic as well as the export markets, and possessing:-
 - a) Optimum physico-chemical characteristics for refrigerated as well as ambient temp. transport and storage, and for industrial processing.
 - b) Longest crop-bearing season/multiple crop-bearing habit.
 - c) High productivity, consistent from year to year, so as to be available in adequate quantities at economic prices.
 - d) Freedom from pests, diseases, and physiological disorders likely to adversely affect the

quantum and quality of supplies on any significant scale.

B. Post-harvest development aspects :

- a) Harvesting fruit at predetermined/optimum maturity for transport, storage, including refrigerated storage, handling and processing.
- b) Sound harvesting practices.
- c) Maximising shelf-life under ambient as well as refrigerated conditions in normal and modified/controlled atmospheres.

4. AGENCIES NOW ENGAGED IN R&D AND EXTENSION ACTIVITIES:

- A. Pre-harvest aspects : - Several State level and Union Govt. level R&D Organisations and institutions, including Agricultural Universities and Extension Agencies.
- B. Post-harvest aspects :- Some of the above bodies and CFTRI, Mysore.

5. AGENCY NOW PROPOSED TO PLAN AND IMPLEMENT THE PROJECT :

A single, multi-disciplinary, all-India Agency or a

Technology Mission may be constituted, vested with total responsibility and commensurate authority and supporting facilities for planning, implementing, coordinating, and monitoring the Project.

6. AID TO THE PROCESSING INDUSTRY:

The areas particularly in need of assistance are :

- a) R & D including product, process, and packaging development; particularly development of new, novel, and innovative products catering to the taste preferences of the target population.
- b) Quality Control/Assurance and upgradation.
- c) Marketing, including

international (export) marketing.

- d) Training, Demonstrations, Visits to modern fruit and vegetable processing units in USA, Brazil, Australia, etc.
- e) Conducting Seminars and Workshops for the practical benefit of the Processing Industry.
- f) Providing the services of experts (both Indian and foreign) in the above and other relevant fields to Indian Processing Units.
- g) Direct assistance to Processing Units for development of properly identified, well-defined, and economically viable Projects.

7. PHASING OF THE PROJECT

The project may be divided and

implemented in two phases:

- a) The first one for addressing issues of high priority and achieving results of urgent importance and relevance to the Industry, in the short term (say, 3 years).
 - b) And the second one to tackle long-term problems like crop productivity, use and application of biotechnology, industrial utilisation of by-products, etc. (say, 5 to 10 years).
8. All agri-horticultural R&D and Extension Departments and Agencies must have on high priority 'Information and Advisory Cells; able and willing to liaise with the user agencies, such as, individual entrepreneurs, ongoing industrial units, new start-ups, and the like, and effectively service their needs.

PHOSPHATE RICH ORGANIC MANURE FROM WASTES OF SUGAR AND FRUIT JUICE INDUSTRIES

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INTRODUCTION

Conventional phosphatic fertilizers such as di-ammonium phosphate (DAP) and single super phosphate (SSP) contain P_2O_5 in water soluble form¹ because of which plants can take up P readily⁽²⁾. However, after application soils fix P into unavailable forms⁽³⁾ due to the presence of Fe, Al and Mn ions in acidic soils (pH below 5.5) and Ca and Mg ions in alkaline (pH above 7) soils. The most favorable range of soil pH for efficient uptake of P is 5.5 to 7.

Low grade phosphate ores containing +18% P_2O_5 in and 150 micron size (which are also associated with carbonate minerals such as calcite and dolomite) were found to be very effective as direct application phosphatic fertilizers in acidic soils^(4,5). These ores however are not effective in neutral and alkaline soils.

Organic Manure

Soil phosphate solubility increases as the content of organic matter in the soil increases⁽³⁾. Organic matter, while decomposing generates organic acids such as humic and fulvic acids⁽²⁾. Farmyard manure (composted cattle dung) contains these acids in substantial quantities. Farmyard manure (FYM) has the capacity of reducing the toxicity of metal ions present in

the soil^(6,7) due to the capacity of FYM to complex metal ions in the soil.

It is known that certain microorganisms can decompose hard cellulosic materials⁽³⁾. In an interesting study scientists of BCKV Kalyani reported⁽⁸⁾ that organic materials such as straws of paddy, mustard and wood dust that contain lignocellulosic complexes can be effectively composted using fungi such as *Pleuretus sajor caju*, *Polyporus versicolor* and *Phanerochate chrysosporium*. *P. chrysosporium* the most efficient of the three fungi tested, decomposed simul wood dust, such that the compost contained 5.4% humic acid and 8.2 fulvic acids.

Direct Application of Phosphate Rock in weakly Alkaline soils.

Direct application of phosphate rock analysing +34% P_2O_5 and in 74 micron size ie PR (34/74) was studied⁽⁹⁾ mixing rock phosphate with FYM before application at Udaipur (soil pH 7.6) on chickpea (*Cicer arietinum* L.) and wheat (*Triticum aestivum* L.). The results are rather unexpected which are shown (for chick pea) in Table 1.

These results show (1) that FYM alone is very effective but not more efficient than DAP, (2) that in the presence of high grade rock phosphate in very fine size the effectency of the FYM surpasses

that of DAP and (3) that there is a synergistic effect when phosphate rock of high grade in fine size is used with FYM.

Organic wastes from sugar and fruit juice Industry.

Sugar industry produces a waste known as press mud. Every tonne of sugar cane crushed results into the production of 30-40 Kg of press mud. Annual production of press mud in India is estimated at 12 million tonnes. Similarly large quantities of skins, seeds and pomace are generated in mango, tomato and apple juice industries. These wastes can be converted into organic manure and they become value added if they are composted with high grade phosphate rock in fine size to produce phosphate rich organic manure (PROM). Addition (inoculation) of fungi⁽⁸⁾ such as *P. chrysosporium* that can decompose ligno-cellulosic complexes (skins and seeds of fruits after shredding) and bacteria⁽¹⁰⁾ such as *Bacillus megatherium* var. *Phosphaticum* etc (which are commercial available) known to solublise phosphate (minerals) to the decomposing mix will increase the rate of decomposition and the rate of generation of humic and fulvic acids. Addition of cattle dung upto 8% also enhances the decomposition of organic matter⁽²⁾. The role of humic acid in increasing the

yield of various crops has been recently reported⁽¹¹⁾.

Standardization of PROM

Organic manures are not standardized unlike fertilizers which are governed by Fertilizer Control Order. However, if organic manure is to be brought out as a product they need to be specified properly. We at Phosphate Research and Development Center are in the process of standardizing phosphate rich organic manure (PROM), in terms of P_2O_5 (minium of 18%) and either in terms of total of humic and fulvic acids (at a minium of 4%) or in terms of total organic matter and carbon, nitrogen ratio (at 20). Moisture in the final product should be below 20%. It is important to note that the process of anaerobic decomposition of organic matter requires 80% moisture.

Conclusion

The harmful effects of long term usage of chemical fertilizers are slowly being realized as they decrease useful soil flora and fauna. Also, much of the P in these chemical

fertilizers goes waste due to fixation by soils. Organic manure enriched with nutrients, such as PROM appears to be futuristic, as PROM technology is green technology. Organic farming is becoming more and more popular. This gives sugar and fruit processing industries an opportunity to convert their wastes into wealth by converting them into value added products.

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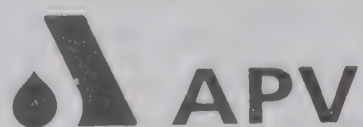
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Table 1 Effect of different treatments on Biomass and out put of chickpea (percentage increase / decrease is given in parenthesis). (ref.9)

S.No	Treatment Condition	Biomass (g)	Seed output (g)
1	Soil	586	160
2.	Only DAP*	728 (+24.23)	258 (+61.25)
3.	PR(34/74)*+FYM @ 1ton ha-1	683 (+16.55)	255 (+59.37)
4.	PR (34 /74)*+FYM @ 2tons ha-1	752 (+28.32)	265 (+65.62)
5.	PR(34/74)*+FYM @ 4 tons ha-1	805 (+37.37)	273 (+70.62)
6.	FYM @ 1 ton ha ⁻¹	601 (+2.55)	162 (+1.25)
7.	FYM @ 2 tons ha ⁻¹	650 (+10.92)	190 (+18.725)
8.	FYM @ 4 tons ha ⁻¹	736 (+25.59)	250 (+56.25)

*Applied @ 40 Kg P_2O_5 per hectare



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